

25 June 2010



Mr Philip Weickhardt  
Presiding Commissioner  
Productivity Commission  
Locked Bag 2  
Collins Street East  
Melbourne VIC, 8003

**Re: Inquiry into Rural Research and Development Corporations**

Dear Mr Weickhardt

Meat & Livestock Australia (MLA) appreciates the opportunity to participate in the Productivity Commission's inquiry into Rural Research and Development Corporations (RDCs).

One of the cornerstones for the success of the Australian red meat and livestock industry has been a long history of innovation underpinned by a strong government/industry partnership. This history of innovation has substantially aided the competitiveness of Australian agricultural industries, and has assisted in the delivery of key government priorities.

The Australian red meat and livestock industry is trade dependent. In 2009 Australia exported 63 per cent of its beef production, 56 per cent of its sheepmeat production and approximately 90 per cent of its goatmeat production. In addition, 954,143 head of cattle and 3.6 million head of sheep were also exported. Because of its heavy reliance on trade, maintaining a comparative advantage in the global marketplace is paramount to the future prosperity of the Australian industry and necessitates ongoing investment in rural research, development and extension (RD&E). Looking forward, the industry has an important role in meeting the food needs of a growing global population and significant challenges, including land and water availability, climate change and biosecurity, will need to be overcome via the adoption and implementation of innovative approaches.

The wider Australian community benefits from a vibrant red meat and livestock industry through its contribution to economic growth and the significant public spillovers that are generated when the industry adopts new technologies and innovative processes. Significant market failures, many of which are unique to the rural sector, prevent sufficient private investment in rural RD&E. Public funding for rural RD&E helps address this systemic underinvestment.

Our submission demonstrates the contribution that MLA, the RDC acting on behalf of the red meat and livestock sector, has made to the rural innovation effort. MLA's key strength is its ability to facilitate industry input and engagement which has informed RD&E investments and facilitated industry-wide adoption of RD&E outcomes that have delivered quantifiable public and private benefits. In collaboration with our industry supply chain partners (including the Australian Meat Processor Corporation and



LiveCorp) MLA has proven to be an efficient and effective service delivery mechanism to address both industry strategic imperatives and government policy priorities.

Should you wish to discuss MLA's submission further please do not hesitate to contact me or my Managing Director David Palmer on 02 9463 9232.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Don Heatley', with a flourish at the end.

**Don Heatley**  
MLA Chairman



**Meat & Livestock Australia**

**Submission to Productivity  
Commission**

**Inquiry into the  
Australian Government  
Research and Development  
Corporations Model**

25 June 2010

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## Abbreviations

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ABARE – Australian Bureau of Agricultural and Resource Economics  
ABRI – Agricultural Business Research Institute  
ABS – Australian Bureau of Statistics  
ACIAR – Australian Centre for International Agricultural Research  
AGBU – Animal Genetics and Breeding Unit  
AGM – annual general meeting  
ALFA – Australian Lot Feeders' Association  
AMLC – Australian Meat & Live-Stock Corporation  
AMPC – Australian Meat Processor Corporation  
AOP – annual operating plan  
AWI – Australian Wool Innovation  
BCR – benefit cost ratio  
BLUP – best linear unbiased prediction  
BSE – bovine spongiform encephalopathy  
BTRE – Bureau of Transport and Regional Economics  
CCA – Cattle Council of Australia  
CGIAR – Consultative Group on International Agricultural Research  
CIE – Centre for International Economics  
CISp – Collaborative Innovation Strategies program  
CRC – Cooperative Research Centre  
CRRDC – Council of Rural Research and Development Corporations  
CSIRO – Commonwealth Scientific and Industrial Research Organisation  
DA – Dairy Australia  
DAFF – Department of Agriculture, Fisheries and Forestry  
DPI – Department of Primary Industries  
EBV – estimated breeding values  
EU – European Union  
FAO – Food and Agriculture Organization  
FMD – foot and mouth disease  
FNBA – Five Nations Beef Association  
GBR – Great Barrier Reef  
GMI model – Global Meat Industries model  
GRDC – Grains Research and Development Corporation  
GVP – gross value of production

HGPs – hormonal growth promotants  
IOC – industry-owned corporation  
IP – intellectual property  
IPR – intellectual property rights  
KPI – key performance indicator  
LPA – Livestock Production Assurance  
MDC – MLA Donor Company  
MINTRAC – Meat Industry Training Advisory Council  
MISP – Meat Industry Strategic Plan  
MLA – Meat & Livestock Australia  
MoU – memorandum of understanding  
MRC – Meat Research Corporation  
MSA – Meat Standards Australia  
NABRC – North Australia Beef Research Council  
NAPSWQ – National Action Plan for Salinity and Water Quality  
NLIS – National Livestock Identification System  
NRE – Department of Natural Resources and Environment  
NRM – natural resource management  
NZ – New Zealand  
OHS – occupational health and safety  
PC – Productivity Commission  
R&D – research and development  
RDCs – Research and Development Corporations  
RD&E – research, development and extension  
RELRP – Reducing Emissions from Livestock Research Program  
ROI – return on investment  
SABRC – Southern Australia Beef Research Council  
SCA – Sheepmeat Council of Australia  
SFA – Statutory Funding Agreement  
SGS – Sustainable Grazing Systems  
TBL – triple bottom line  
tHSCW – tonnes hot standard carcass weight  
UN – United Nations  
UNE – University of New England  
US – United States  
WTO – World Trade Organization



## Executive summary

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This paper, prepared by Meat & Livestock Australia (MLA), is written in response to the Productivity Commission's call for submissions related to its Inquiry into Rural Research and Development Corporations (RDCs).

The MLA submission seeks to address the key concerns raised in the Productivity Commission Issues Paper (March 2010). Key arguments are underpinned by reference to both economic and innovation systems theory and are supported by relevant case studies from the red meat and livestock industry.

**One of the cornerstones for the success of the Australian meat and livestock industry has been a long history of innovation, driven by government/industry partnership. This history of innovation has substantially aided the competitiveness of Australian agricultural industries. Government support for agricultural research continues to be warranted.**

- Australian Governments have a long history of supporting agricultural research. State Government involvement extends back to the 1800s, while, at a Federal level, the Council for Scientific and Industrial Research was established in 1926 and the first agricultural levies were introduced in 1936. Government support for agricultural research is justified both in terms of the results achieved from this support and from broader economic considerations.

Productivity growth in Australian rural industries, of 2.8 per cent per annum, has consistently exceeded the national average for Australian industries (of about 1.4 per cent). Driven by this productivity growth, the competitiveness of Australian agriculture is the envy of agricultural industries in many other parts of the world. There are some signs, however, that productivity growth in Australian agriculture may be slowing. In addition, given the current environment, in which productivity growth has been identified by government as a national priority, it would be counterproductive to reduce Government research support for agriculture. There is strong evidence to suggest that without industry and government co-investment for R&D, Australia's primary industries would be unable to sustain the level of innovation critical to maintaining global competitiveness.

- Agricultural RD&E directly benefits not only industry participants, but also the wider Australian community. These spillovers include:
  - The spatial diversification of the Australian population which supports rural and regional communities and offsets the increasing cost of urbanisation.
  - Productivity advances in Australian food production contribute to global food security by boosting Australia's production and through the transfer of technology overseas, especially to developing countries.
  - The adoption of more sustainable management practices in the agricultural sector which generates significant public environmental benefits.
  - When food production becomes more innovative and efficient consumer receive significant benefits in the form of more abundant, affordable, higher quality, safer and nutritious food. In the red meat and livestock industry consumers often capture more of the benefits than producers.
  - Investing in innovative capacity (scientists) helps maintain society's knowledge skills and adaptability.

- The Australian agricultural sector exhibits a number of unique attributes that warrant Government support for research. These unique attributes include:
  - The sector (especially the livestock industries) has a structure dominated by small and medium enterprises which causes challenges for R&D. These challenges include: scale, free rider issues, information failure and risk aversion issues.
  - Long time lags between funding R&D and generating benefits (approximately 20 years on average to generate peak benefits). Therefore, levy payers and beneficiaries are often different people, even though they are still producers.
  - The inability of private firms to capture all the benefits accruing to agricultural innovations.

The generation of significant spillovers that cannot be captured by firms in the industry and the significant number of market failures that exist in the rural RD&E marketplace result in a lack of incentive for sufficient private investment in rural RD&E.

**Rural innovation generates both industry-specific and community-wide benefits. These outcomes are inextricably linked.**

The generation of social and environmental benefits from RD&E can be the unintended consequence of seeking productivity improvement. However, increasingly these broader community outcomes are intended and being delivered as the result of projects being carefully crafted to deliver a mix of economic, social and environmental benefits. A major driver of this shift has been the alignment of MLA's RD&E portfolio with the government's National and Rural Research Priorities.

Spillover benefits flow both ways between the public and private sectors and co-investment (industry and government funding) is the most efficient mechanism for leveraging these synergies. Independently funding projects to generate public and private benefits would be disadvantageous because:

- Significantly lower adoption rates would occur for projects focused on public benefit, affecting the realisation of total (public and private) benefits.
- The cost efficiencies and synergies generated from jointly undertaking private and public RD&E would be foregone.

Industry specific RDCs provide a unique opportunity to develop and deliver integrated innovation strategies across a broad range of areas which deliver both public and private benefit. Across MLA's RD&E portfolio there is a balance of projects delivering public and private benefit, and it is therefore appropriate to continue balancing public and private funding at the portfolio level.

**Public investment in RDCs does not crowd out private investment; to the contrary, it supports and encourages private investment.**

In the red meat and livestock industry the volatility of world commodity prices affect the profitability of levy payers from year to year. Many factors, such as climactic conditions and world supply of and demand for protein products and exchange rates, affect world meat prices. Support for compulsory levies directed toward RD&E with long payoff periods becomes challenging in years of low profitability. The government matching dollar provides a strong incentive for maintaining long-term industry investment in RD&E.

Furthermore, because of the linked nature of the industry and community-wide benefits that flow from rural R&D, industry cannot justify independently funding RD&E where substantial benefits are not captured by the industry.

The MLA Donor Company (MDC) forms a critical component of MLA's research strategy and it has a proven capacity to attract voluntary contributions (over and above compulsory levy contributions). Furthermore, a requirement of MDC projects is that they contribute to the overall quantum of innovations available for uptake by the broader industry and that they enhance the innovation culture and capacity of private organisations working in the industry. Industry private investment has increased as a result.

The co-investment (public and private funding) in MLA's RD&E portfolio enables a balanced approach across the RD&E spectrum which includes a mixture of both short and long term strategic, basic, applied, development, capability building, adoption and commercialisation projects. MLA's portfolio would likely contract to more applied, short-term projects in the absence of public funding.

**Separate meat and livestock RDC organisations exist to manage processor levies (AMPC) and live exporter levies (LiveCorp). This arrangement ensures strong linkages are maintained between the levies processors and live exporters pay and the projects these levies fund – achieving continued strong support for investment by these sectors in RD&E.**

In the red meat and livestock industry maintaining support for the compulsory levy along the supply chain requires the separation of governance arrangements between producers, processors and live exporters. While the governance structures of MLA, AMPC and LiveCorp are necessarily distinct, there is close collaboration on strategy development and RD&E project design. MLA manages the implementation of the RD&E strategy on behalf of all sectors (with detailed and ongoing consultation with and reporting to AMPC and LiveCorp) and so achieving significant administrative efficiencies.

### **The RDC model is fundamentally sound and does not require significant restructuring**

MLA considers that the RDC model is fundamentally sound and that it has clearly demonstrated its capacity to deliver benefits to industry and the broader community as evidenced by:

- Australian agricultural land productivity has been improving faster than the average for developed countries (Alston et al. 1999).
- The collaboration between MLA and RD&E agencies (including state and territory Departments of Primary Industries, CSIRO, the Cooperative Research Centres and universities) has been effective in improving on-farm productivity, product quality and feedlot sustainability.
- MLA and state and territory DPI investments are estimated to be responsible for 40-80 per cent of observed and forecast productivity growth in the Australia livestock sector between 2000 and 2015. Animal welfare will also be improved over this period through feedlot compliance with the National Feedlot Accreditation Scheme (CIE 2009b).

The model has proven to be flexible and to allow for adaptation as the needs of government and industry stakeholders have evolved.

While there may be opportunities to continue to evolve and enhance the RDC model (with minor modifications) it is considered that the following elements of the current model must be preserved:

- The mechanism to retain specific industry sector responsibilities and focus (as provided by RDCs) is deemed critical.
- A whole-of-supply chain approach is critical and RDCs should not be limited to an on-farm focus.
- A broad R&D and innovation agenda is important and investments should be maintained along the continuum encompassing strategic R&D, applied R&D, and adoption and capability building.
- Independent governance arrangements delivered by skills-based boards.
- Integrated approaches to the development and implementation of R&D initiatives that deliver both public and private objectives.
- Strong industry-government partnerships supported by government matching dollars (at least at current levels) with a mix of compulsory levies and voluntary contributions from industry participants along the supply chain.
- The opportunity for integrated marketing and R&D functions for those sectors where this is deemed important.
- Continued separation of investment decisions from R&D providers (demand-driven not supply-driven R&D).
- Opportunities to extend international partnerships and alliances.
- Continued support for both public and private provider network.

In MLA's view, more fundamental changes to the RDC model do not appear to be either warranted or appropriate.

**Flexibility is a key strength of the RDC framework – enabling organisations and funding streams to adapt to the changing innovation and RD&E needs of the industry and broader community.**

The RDC framework enables RDCs to evolve and continually improve the efficiency of delivery and quality of R&D outcomes. Examples of changes which have been accommodated within the current framework include:

- The transition of some RDCs from a statutory organisation to a company limited by guarantee
- The merging of marketing and R&D functions within one organisation
- The aligning of RDC R&D priorities with government's national and rural R&D priorities
- An increased focus on whole of chain innovation
- An increased focus on adoption and evaluation
- Increased collaboration with private and public research institutions, both domestically and internationally

The RDC framework also enables flexibility with respect to levies. MLA's levy funding system incorporates a mix of compulsory producer levies, live exporter contributions, processor contributions and external voluntary contributions (through the MLA Donor Company). Receiving contributions along the supply chain has proven very effective in the case of MLA, and the mix of compulsory and voluntary levies has facilitated the building of industry capability, has assisted in accelerating the adoption of R&D outcomes and has resulted in a significant increase in industry investment in R&D.

**RDCs play a unique role and have strengths that contribute significant value to the rural innovation system.**

The systems approach to understanding innovation at the national, sectoral and organisational levels identifies a set of potential failures that are not captured by the standard market failure framework. Generally, systems failure occurs via constraints on the capabilities of firms and elements of the innovation system to effectively coordinate into a functional system. Examples of systems failure include missing institutions, failed connections, low or absent co-ordination amongst relevant knowledge sources, business model incompatibility across the innovation value chain and failure of new knowledge to be successfully retained.

The systems approach to understanding innovation has given rise to the concept of *national innovation systems* which is clearly embedded in the Australian Government's innovation policy (*Powering Ideas* 2009). However, complementary to this approach is the concept of *sectoral innovation systems* which are considered to be critical to the development of effective innovation policy and interventions within specific industry groups.

Based on the innovation systems approach, RDCs are uniquely positioned to facilitate, coordinate and optimise the complex interactions required at the level of their individual rural industry sectors. The role of RDCs as 'systems integrators' within their specific rural industry sector is a dynamic role that evolves as industry and government issues shift in response to changing external conditions. In addition, the integration role of RDCs complements that of other elements within the system such as R&D providers; Cooperative Research Centres (CRCs), technology commercialisers; public and private extension agencies; financial institutions; and government policy agencies who all play a critical role in the development and delivery of new knowledge and innovation opportunities. However, it is only RDCs that can act to integrate and coordinate across all these disparate elements in such a way as to translate both industry needs and government priorities into a meaningful and well functioning innovation system.

**The coalescing of marketing and RD&E functions within MLA has delivered greater benefits to the industry and the wider community.**

The integration of marketing and R&D within the one organisation has proven beneficial. It has reinforced the importance of customer-driven innovation and has better facilitated demand-driven adoption.

MLA's overseas offices, which are located in all major red meat markets (albeit with a primary focus on delivering industry marketing and market access initiatives) have proven invaluable in transferring clear customer and market signals back to MLA's innovation/RD&E business units. These customer requirements are built into the industry's innovation and RD&E programs as appropriate (examples include food safety, traceability, eating quality and new product development).

The transformation of the Australian lamb industry demonstrates the benefit of a coordinated R&D and marketing approach. The lamb industry is one of the great success stories of the agricultural sector because it has transformed from an industry producing variable product, predominantly a by-product of the wool industry, to a vibrant industry worth well over A\$3 billion. By the 1990s R&D efforts had given the lamb industry the ability to produce large, lean lambs that were the preference of North American consumers while also meeting Australian consumers' growing demand for leaner lamb cuts. While the technology was available, a price signal to producers was required to accelerate adoption. The marketing efforts of Australian Meat & Live-Stock Corporation (AMLC) and MLA facilitated the differentiation and promotion of cuts from the large, lean lambs, resulting in higher lamb prices and demand-driven adoption of R&D. The transformation involved a positive feedback cycle between market research, product development, R&D, further marketing, product development and so on. No single component alone could have produced the change that was achieved. The full realisation of benefits generated by the lamb industry's transformation occurred as a result of the merge between industry's research (MRC) and marketing (AMLC) organisations.

**MLA's whole-of-supply chain approach to RD&E has delivered some of the industry's biggest breakthroughs.**

MLA strongly supports a whole-of-supply chain focus for rural RD&E because it ensures R&D is consumer and customer driven and the industry extracts greater benefit from innovations. For instance, innovations that improve quality on-farm (for example, improved food safety, product traceability or better environmental performance) must be protected and enhanced through the supply chain in order for the desired outcome to be realised and for the customer to recognise and value the innovation.

This whole-of-supply chain approach has led to some of the industry's biggest breakthroughs such as the beef eating quality program. Many factors along the red meat supply chain affect the eating quality of beef. The industry's grading system, Meat Standards Australia (MSA), can predict the eating quality of a cut of beef given the animal's history, meat processing methods and the intended use of the beef. The development of MSA required R&D effort along the supply chain to investigate all the practices on-farm, during transport, at the saleyards, and during processing and storage that have an impact on quality. This R&D effort informed the development of an integrated quality system that covers all participants in the supply chain. As the negative actions of one member of the supply chain can undermine the eating quality integrity of a cut of beef, this whole-of-supply chain approach is the best mechanism for extracting the maximum benefit from the MSA system.

The whole-of-supply chain approach of the red meat and livestock industry has been facilitated by a number of elements:

- An MoU amongst all major red meat industry groups to support key joint industry programs.
- A planning process which involves consultation and input from all industry sectors.
- All major groups along the supply chain pay levy contributions.
- Key account/stakeholder management within MLA for all major industry groups.

- Broad supply chain representatives on the MLA Board.
- Communication of benefits to producers of investment further down the value chain.
- Specific programs to build innovation capability along the supply chain such as the Collaborative Innovation Strategies Program and the red meat industry Professional Development Program.

**Coordination and collaboration have been extremely effective for the red meat and livestock industry. There is an opportunity to broaden coordination across the entire rural sector.**

There is an increasing emphasis on the importance of building effective interactions and networks within the rural innovation system in order to maximise opportunities for collaboration and to ensure an efficient and coordinated utilisation of scarce resources.

The current RDC model has demonstrated a strong record of collaboration and the flexibility to embrace new forms of collaboration in order to assist government to achieve emerging policy objectives in the broader cross-sectoral domain (eg climate change). MLA has not identified any major areas where opportunities for collaboration within the rural innovation system appear to be unduly constrained. However that is not to say that further opportunities for collaboration do not exist and should not be explored.

It is noted that collaboration and coordination are not ends in themselves. Rather they are tools that can assist industry and government to achieve their goals of improving competitiveness, productivity and sustainability. It is also noted that collaboration can sometimes involve high transaction costs such as those associated with lengthy negotiations around intellectual property and other contractual issues and that it is ultimately up to potential partners to determine whether the value of collaborating outweighs these costs.

Collaboration with overseas partners is seen as a high priority for the rural sector, and while MLA has been very proactive in this area it is considered that further opportunities could be realised.

Additional focus and support from government, greater general awareness of the benefits and opportunities for international collaboration, and better communication of lessons learned via innovative case studies are suggested as potential enablers to support further growth and success in establishing international collaborations for the benefit of Australia's rural industries.

There are also opportunities to continue to evolve effective coordination mechanisms within the rural innovation system. In relation to RDCs, the CRRDC is considered to provide the most suitable mechanism upon which to build this enhanced coordination framework with specific areas for consideration included in the submission.

**MLA's focus on delivering world-class RD&E services effectively and efficiently, while being a responsible custodian of levies and government funding is a result of strong governance arrangements.**

Stakeholder (government and levy payers) accountability, a well experienced skills-based board of directors, independent performance reviews and a strong culture of transparency are the critical components of MLA's strong governance arrangements. As a result MLA's Board and management are focused on:

- Delivering world-leading RD&E outcomes
- Managing costs by increasing administrative efficiencies
- Being a responsible custodian of industry levies and government funding
- Implementing continual improvement through systematic evaluation

**Industry and community-wide benefits can be maximised by a stronger evaluation program where projected benefits (ex-ante evaluation) serve to direct R&D priorities and realised gains (ex-post evaluation) verify past and future investment decisions while identifying key lessons learned.**

Evaluating the outcomes of RD&E in the rural sector is challenging. It involves measuring the impact of RD&E outcomes on a biological system that is responding to changing environmental conditions and the production decisions made by producers in response to changing market conditions. Multiple organisations are concurrently undertaking a range of RD&E projects and providing other industry development services aimed at delivering economic, environmental and social benefits. This situation clearly adds complexity to the evaluation of outcomes and in particular makes it difficult to isolate a cause and effect for a single R&D or extension project. While these challenges are significant, MLA is committed to continuing the development of our evaluation processes as we understand the importance of demonstrating to government and industry stakeholders their return on investment. Evaluation also forms a core component of MLA's governance and internal program improvement systems.

MLA (and previously MRC) has a long history of evaluating individual R&D projects. In 2005 MLA commissioned an independent review of its evaluation process and the MLA Evaluation Framework was developed as a result.



# 1 Background

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## 1.1 About MLA

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Meat & Livestock Australia Limited (MLA) is a producer-owned company that began operations on 1 July 1998. Predecessor organisations to MLA can be traced as far back as 1936 and, most recently, included the Meat Research Corporation and the Australian Meat & Live-Stock Corporation.

MLA provides marketing and research services and solutions to Australia's red meat and livestock industry including livestock producers and lot feeders, meat processors, wholesalers, foodservice operators, retailers and exporters of red meat and livestock.

### 1.1.1 How MLA is funded

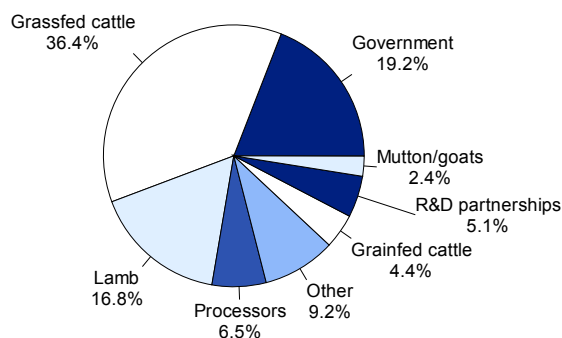
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MLA is funded by:

- Transaction levies paid on livestock sales
- Australian Government dollar-for-dollar funds for investment in research and development
- Co-operative contributions from individual processors, wholesalers, foodservice operators and retailers, and other partners in the innovation value chain
- Contributions from processor and livestock export industry bodies

In 2008-09 MLA's revenue amounted to \$163.4 million

**Figure 1.1**  
MLA revenue 2008-09



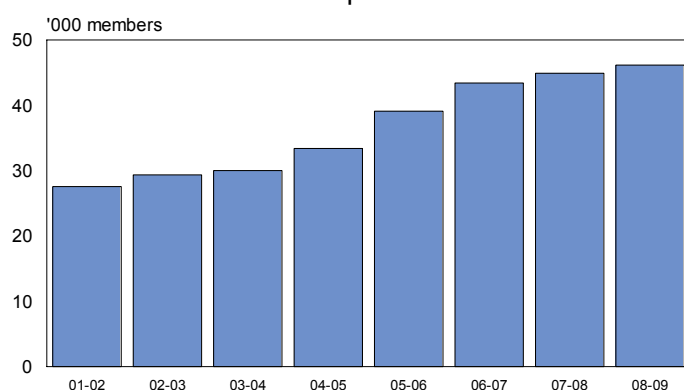
### 1.1.2 MLA membership

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Over 47,000 Australian cattle, sheep and goat producers are members of MLA, representing over 80 per cent of Australia's red meat production in 2008-09.

MLA aims to ensure all stakeholders are aware of its role in the red meat and livestock industry, the opportunities created by MLA's programs and their potential benefits to industry.

**Figure 1.2**  
Growth in MLA membership



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### **1.1.3 Industry vision**

A profitable, sustainable meat and livestock industry that meets consumer and community expectations

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### **1.1.4 MLA's mission**

World-class services and solutions in partnership with industry and government

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### **1.1.5 MLA's organisational structure**

We operate in partnership with industry and government to deliver world-class products and programs.

#### *The Australian Government*

The Australian Government sets high priority R&D objectives covering community, industry and environmental concerns. These are addressed via our Memorandum of Understanding and Commonwealth Deed of Agreement.

#### *Industry peak councils*

The following peak councils provide policy direction, scrutinise budgets and monitor our performance on behalf of the red meat industry:

- Australian Lot Feeders Association
- Australian Livestock Exporters' Council
- Australian Meat Industry Council
- Cattle Council of Australia
- Goat Industry Council of Australia
- Sheepmeat Council of Australia
- Red Meat Advisory Council

#### *MLA Board of Directors*

The Board sets strategic priorities and direction for the company, approves and monitors progress against the strategic plan, evaluates performance and budgets, and oversees risk management and compliance.

## MLA Executive Committee

The Managing Director and seven General Managers make up MLA’s Executive Committee, which is responsible for guiding MLA’s performance through the development of key strategies, business plans and policies, and ensuring MLA meets its corporate objectives.

### 1.1.6 Where we’re located

MLA staff are based strategically in all of our major markets (Australia, North America, Europe/Russia, China, Japan, Korea, Middle East and South East Asia) to leverage the best possible access to all stakeholders.

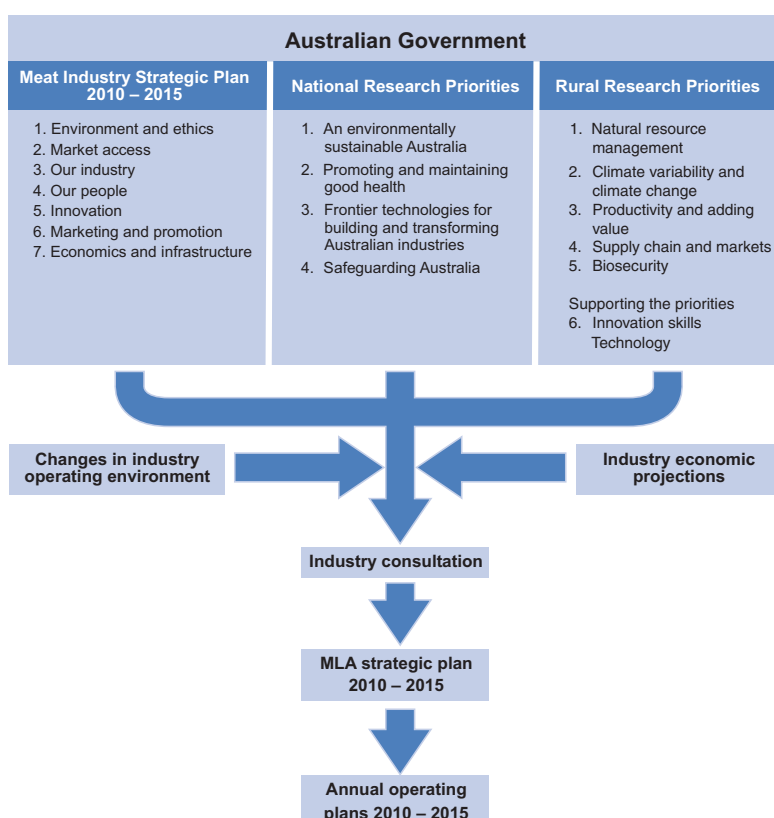
## 1.2 MLA’s strategic approach

The Australian meat and livestock industry operates in a demanding and sophisticated global marketplace. The industry faces pressure from other protein products, competing red meat supplying countries, constantly changing and demanding consumer trends, and increasing community scrutiny.

The focus and direction of MLA’s marketing, and research and development effort is provided by the industry peak councils’ Meat Industry Strategic Plan 2010–2015 (MISP) and its R&D is closely aligned to the Australian Government’s National and Rural Research Priorities.

In addition, local, regional and global meat industry trends, macro and micro economic drivers, and the outcomes of regular industry consultations are all carefully considered when planning our programs and initiatives.

**Figure 1.3: Priority alignment of MLA plans with Government’s priorities and the Meat Industry Strategic Plan**



### ***1.2.1 MLA's strategy***

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Every aspect of our work is geared to delivering world-class services and solutions for a profitable and sustainable red meat and livestock industry. We carry out these services to support our five strategic imperatives:

- Improving market access
- Growing demand
- Increasing productivity across the supply chain
- Promoting industry integrity and sustainability
- Increasing industry and people capability

### ***1.2.2 MLA's planning process***

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Triple bottom line (TBL) approaches are an important aspect of our strategic and operational goal setting and evaluation processes.

The MLA Board conducts a regular formal planning process which includes a strategic planning workshop to review and discuss the direction of the Australian red meat industry and assess MLA's priorities within this context. This is followed by an annual industry strategic planning process – informed by several industry working parties or taskforces – to develop marketing, research, development and extension priorities for the following 12-month and five-year periods.

The resulting five-year MLA strategic plan is developed for formal review by the MLA Board, Minister, industry peak councils and the Department of Agriculture, Fisheries and Forestry, and it forms the basis for developing closely aligned annual operating plans.

### ***1.2.3 The review process***

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The strategic plan is a dynamic plan that the MLA Board and Executive Committee review annually to assess the company's progress against its measures and ensure it remains relevant to industry, government, community and consumer needs.

MLA continues to consult with industry through the annual industry strategic planning meeting and other consultation processes to ensure it operates in partnership and in close alignment with the requirements of the Australian meat and livestock industry.

In addition to measuring our performance annually through program KPIs, MLA evaluates its work for its contribution to industry, impact on the Australian community and environment, and the efficiency of the services it provides. Objective assessment of MLA programs and activities against our strategic imperatives and alignment with the Australian Government's research priorities is undertaken within an independent evaluation framework developed by the Centre for International Economics.

### ***1.2.4 MLA's partnership with industry and government***

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In order to deliver its programs cost effectively, a crucial element of MLA's business approach is to leverage opportunities for collaboration and combining investments in partnership with industry and government.

Many of MLA's on-farm R&D investments, funded by transactions paid on livestock sales and matched dollar-for-dollar by the Australian Government, involve cooperation with state agencies, cooperative research centres and international research agencies.

The company contributed strongly to the development of beef and sheepmeat sector plans under the National RD&E framework that seeks to engender national collaboration across a range of agricultural industries by publicly-funded RD&E agencies.

MLA also has a strong record of collaboration with other research and development corporations, including Australian Meat Processor Corporation (AMPC), Livecorp, Australian Wool Innovation (AWI), Grains Research and Development Corporation (GRDC) and Dairy Australia (DA), to successfully deliver industry programs such as Making More From Sheep, Grain & Graze and Evergraze. In 2010 MLA had 150 collaborative agreements with more than \$60 million in co-investment designed to deliver improved productivity and community benefits.

Cooperative Research Centres (CRCs) are a key mechanism by which we pool our investment with many collaborators – we are currently involved in a number of CRCs.

We also collaborate with international organisations where appropriate, as in the case of our work in the area of genetics and genomics.

Working with the commercial sector is a key area for maximising our levy investments and through the MLA Donor Company (MDC) we partner in 50:50 funding with private enterprise to accelerate R&D and the uptake of its outcomes to drive industry efficiencies and competitiveness.

MDC initiatives are clearly integrated with the overall objectives of our five year strategic plan with a diversity of project areas that aims to:

- Significantly increase the level of enterprise investment in innovation in the Australian red meat industry
- Enhance the outcomes of commercially focused innovation thereby ensuring quantifiable benefit to individual enterprises and the industry overall
- Accelerate the commercialisation of R&D adding to the quantum of innovations available to industry
- Assist the Australian red meat industry develop an innovation culture and capability

### **1.3 Overview of MLA's RD&E programs**

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The long-term prosperity of the red meat industry is critically dependent on increasing efficiency; discovering science-based innovations that improve productivity in an environmentally responsible manner; and ensuring that both on-farm and off-farm decision-makers have high calibre information available.

Declining terms of trade for producers, and ongoing cost pressures for processors and livestock exporters trying to meet customer expectations in competitive markets, mean that all sectors of the industry must continuously strive for improvement.

MLA's role is to provide the industry with the latest research tools and information solutions that enable individual enterprises to reach their potential.

While uptake of these services and solutions will always be the decision of individual enterprises, MLA will strive to demonstrate commercial benefits across the value-chain that will contribute to the growth of the industry as a whole.

MLA delivers its services and solutions for research, development and extension via its five strategic imperatives:

Imperative 1: Improving market access

- 1.1 Enhancing product integrity
- 1.2 Ensuring a whole of industry approach to maintaining and liberalising access to world meat markets
- 1.3 Maximising market options for producers and exporters in the livestock export trade

Imperative 2: Growing demand

- 2.1 Achieving consistent eating quality
- 2.2 Enhancing the nutritional reputation of red meat
- 2.3 Developing new products

Imperative 3: Increasing productivity across the supply chain

- 3.1 Increasing productivity on-farm
- 3.2 Increasing productivity off-farm
- 3.3 Improving supply chain and market information
- 3.4 Improving animal health and biosecurity

Imperative 4: Promoting industry integrity and sustainability

- 4.1 Ensuring sustainability and demonstrating environmental stewardship
- 4.2 Responding to climate change
- 4.3 Continued improvement in animal welfare
- 4.4 Community communications

Imperative 5: Increasing industry and people capability

- 5.1 Increasing adoption of innovation
- 5.2 Working with industry to attract, develop and retain world-class people
- 5.3 Building innovation capability
- 5.4 Supporting industry with policy research

**Table 1.1: Australia's largest rural industry at a glance**

Subject	Lamb/Sheep	Cattle	Goats	Total
Total domestic value	\$2.51 billion	\$6.43 billion	=++	<b>\$8.94 billion</b>
Total red meat export value (free on board)	\$1.46 billion	\$5.05 billion	\$72 million	<b>\$6.58 billion</b>
Livestock export value	\$340 million	\$653 million	\$10 million	<b>\$1 billion</b>
<b>Total red meat and livestock value</b>	<b>\$4.32 billion</b>	<b>\$12.14 billion</b>	<b>\$82 million</b>	<b>\$16.52 billion</b>
Total nation flock/herd size (head at 30 June)	73 million	28 million	-	
No. of properties +	31,400	61,900	-	
Workforce size**	133,000	148,000	-	
Total land area under cultivation# (hectares)	164 million	325 million	-	
Annual production (cw tonnes)	658,000	2.1 million	-	<b>2.8 million</b>
Australian domestic usage (cw tonnes)	285,000	703,000	-	<b>988,000</b>
Total exports (estimated cw tonnes)	373,000	1.4 million	20,700	<b>1.8 million</b>
Total exports (shipped weight tonnes)	301,805	967,700	20,500	<b>1.3 million</b>
Japan (shipped weight tonnes)	17,400	362,600	100	<b>380,100</b>
Korea (shipped weight tonnes)	2,700	113,000	400	<b>116,100</b>
US (shipped weight tonnes)	49,600	282,100	11,000	<b>342,700</b>
SE Asia and the China's (shipped weight tonnes)	59,400	109,700	4,300	<b>173,400</b>
Middle East (shipped weight tonnes)	79,100	13,900	300	<b>93,300</b>
<b>Key competitor nations</b>	<b>New Zealand, China</b>	<b>US, Brazil</b>	<b>China, Pakistan</b>	

All figures are based on MLA/ABS/ABARE 2008-09 unless otherwise stated. ABS flock herd and property figures are as at June 2009.

\* Total industry value is for meat. It excludes offals, hides and skins. The estimate of domestic expenditure on each red meat is calculated by multiplying and estimated volume consumed (estimated retail weight) in Australia by its average retail price.

\*\* Latest available data from ABS and ABARE (2006-07). Farm operations with sheep and cattle have been included in each area. Total includes both retail and processing staff. Due to the existence of mixed enterprises, double counting may be present among the two categories.

+ Bases on ABS figures for farms with an Estimated Value of Agricultural Operations EVAO > \$5,000 per annum, 2007-08 data.

# Based on ABARE survey data (2007-08). All farms surveyed by ABARE have an EVAO > than \$40,000 per annum.

++ Domestic value is not available.

## 1.4 Market environment

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### *The Australian cattle and beef industry*

The Australian cattle and beef industries continue to face a most challenging and volatile physical, financial and regulatory environment.

While domestic consumers still make up Australia's largest single market, two thirds of all production is exported – hence, maintaining international competitiveness is a critical challenge.

The domestic market has been relatively stable over recent times, with underlying steady consumption growth coming from population growth and continuous economic expansion. Strong domestic demand has contributed to a 66 per cent growth<sup>1</sup> in the value of domestic beef sales over the past decade.

The international beef trading environment has become even more challenging over recent years, due to the unprecedented currency volatility, the legacy left by the global credit crisis (GCC) on credit availability for trading and product storage and the recession across the principal beef markets.

Australian beef export processors have suffered major losses since 2008, due principally to the global decline in beef demand and currency appreciation and volatility. Cost increases, especially related to labour shortages, have also been a contributing factor. This has led to plant closures and a widespread curtailing of operations.

Market access and integrity issues continue to have a major influence on Australia's international beef competitiveness. Australia enjoys an almost unique position in global trade, being (together with New Zealand) free from major cattle diseases that have shaped access around the Pacific Basin – particularly bovine spongiform encephalopathy (BSE) and foot and mouth disease. This disease freedom and industry and government's programs to prevent disease and instigate best practice integrity systems have helped Australia maintain access to North Asia and North America, access denied or restricted for major competitors due to disease and integrity issues.

This access helped to boost the Australian industry and trade to new heights in the mid-2000s, as the absence of the US from key Asian markets and Brazil and Argentina from the US created a major lift in demand for Australian beef. As US product returns to Japan and Korea, it is Australia's reputation for quality and integrity that continues to underpin our majority share of these import markets.

While enjoying well deserved access to markets due to disease freedom and product integrity, Australian beef exporters continue to face other major trade access barriers, principally quota tariffs in Europe and North America, tariffs of around 40 per cent in Japan and Korea, and technical barriers in other Asian countries and elsewhere. These greatly constrain trade in beef and can distort Australia's competitive position, especially due to the recent proliferation of free trade agreements.

Another important export segment currently under extraordinary pressure is the live export trade, principally to Indonesia. This trade has recovered rapidly over the past decade, due to the expanding demand for fresh (mainly Halal) beef in South East Asia and the Middle East and the severe constraints on local beef production in these regions, outside of feedlots.

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<sup>1</sup> Nominal value



However, despite world's best practice in cattle sourcing, handling, feeding and transport, this trade continues to face major political opposition, regulatory pressures and threats.

In cattle and beef production, Australia remains globally competitive, having a cost of production similar to, or a little higher than, South American suppliers, but fully competitive with those in North America and well below costs throughout Europe. However, much of the industry has faced low profitability over recent years, due to the severe droughts and declines in overseas and local demand, related to the economic downturn and growing competition from the US, South America and India and from cheap poultry meat.

The challenge is for the industry to match the ongoing productivity growth in other supplier countries, especially North America, South America and India, and in competing proteins, especially chicken and pig meat.

### *The Australian sheepmeat industry*

While the Australian sheepmeat industry faces the same volatile physical, financial and regulatory environment as the beef industry, it has benefited from a growing global imbalance between demand and supply of sheepmeat and an extraordinary growth in local demand for the product.

Unlike beef, the majority of lamb produced (55 per cent) is consumed in Australia, with growth in local demand matching that of export markets over recent years. However, when mutton and live exports are accounted for, the balance tips in favour of exports.

Growth in overseas demand for Australian sheepmeat is largely being driven by a retraction in supply. With Australia and New Zealand (NZ) the only major world sheep meat exporters, and the capacity for expansion in NZ supply severely limited, Australia's ability to supply additional product is being tested.

Consequently, lamb and sheep prices are currently at record high levels, though this has not been fully translated into producer profits, due to the succession of drought years and poor returns to companion products, particularly wool and grains. Despite a major shift in the sheep flock from a fine wool focus to prime lambs, lamb production efficiency has failed to lift over the past decade, in part due to drought. This emphasises the challenge faced by the industry to improve productivity, especially now that the sheep flock is at its lowest point since 1905.

Despite the recent lift in demand, the sheepmeat industry recognises the ongoing importance of market access, product integrity, environment and animal welfare issues. The industry is pursuing major research initiatives and innovations in response to current and anticipated consumer, customer, trade and government requirements.

The most significant trade barrier restricting Australian sheepmeat exports is the European Union's tariff-rate quota. Restrictions to the Indian sheepmeat market and a raft of ongoing technical trade issues also affect Australian exports.

The live sheep trade is also tightly controlled by government regulations and international agreements which, together with a falling flock, are constraining the Australian industry's capacity to fully meet the rapidly growing demand for fresh sheepmeat in the Middle East.

### *The Australian goatmeat industry*

Australia is a relatively small producer of goatmeat, but is the world's largest exporter. Approximately 1.4 million goats are slaughtered each year, and another 90,000 exported live. The industry is small relative to cattle and sheep – with around 10 million cattle slaughtered or exported live each year, and 35 million sheep and lambs.

The goatmeat industry has been expanding rapidly in recent years, with the value of goatmeat exports alone increasing almost four-fold over the past decade, from \$24 million in 1999 to \$87 million in 2009. Over the same period, goatmeat export volumes have expanded 130 per cent, from 11,000 tonnes, to 25,000 tonnes.

Global demand for goatmeat has been expanding rapidly, led by the Middle East, as goat is a traditional meat in the expanding Muslim communities.

The lack of accurate supply statistics prevents estimation of local goatmeat production or consumption, though it is clear that the majority of goats produced are exported either as goatmeat or live.

Like the sheepmeat industry, the principal concern of the Australian goat industry is supply – with growth in demand for specified product, including for high standards relating to supply (continuity and quality), animal welfare and environmental sustainability, exceeding supply growth. The greatest impediment to satisfying this demand is the fragmented nature of most goatmeat supply chains.

In attempting to better meet this growing demand, the Goat Industry Council of Australia recently applied to the Minister for Agriculture, Fisheries and Forestry for a reapportionment of the goat transaction levy. The total goat transaction levy is 37.7 cents per head and the R&D component of the levy is currently 10.5 cents per head. The industry has requested that the 10.5 cent R&D component of the levy be increased by 60% or 6.2 cents per head, to total 16.7 cents. The total levy will remain unchanged; therefore, there will be a commensurate decline in the marketing component of the levy.<sup>2</sup>

The research priorities listed included supply chain support, improved on-farm management and business analysis tools, finishing systems and meeting specifications. All the priorities are related to supply and must be pursued in parallel with the goat industry's ongoing commitment to improving animal welfare, environmental sustainability, productivity and competitiveness.

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<sup>2</sup> *Reapportionment of the Goat Transaction Levy* Submission to Minister for Agriculture, Fisheries and Forestry prepared by The Goat Industry Council of Australia on behalf of the Australian goat industry, March 2010

## **2 Rationales for government funding support**

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### **2.1 Rationales for government funding support**

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There is a long history of Australian Government support for business investment in R&D, particularly in the rural sector. For Australian businesses in general the rationale for this support lies in the relationship between innovation, economic development and the living standards of the Australian population. The Australian Government's *Powering Ideas* framework recognises the important role that government must play in the innovation system and the need to improve Australia's innovation performance compared to the rest of the world. The government has boosted the science and innovation budget by 25 per cent in 2009-10 to improve Australia's productivity and competitiveness. These considerations also apply to the rural sector, but the rural sector has received a higher level of government funding for RD&E because:

- Rural RD&E generates significant spillovers that benefit the wider community
- There is a higher prevalence of market failures in the rural R&D marketplace because of factors unique to the rural sector

As will be detailed in this chapter, this support has helped create Australian rural industries that are among the most innovative in the world and well equipped to adapt to the new challenges they continually face.

Productivity growth in Australian rural industries, of 2.8 per cent pa, has consistently outstripped the national average for all Australian industries (of about 1.4 per cent). This productivity growth and government support for rural R&D benefits not only industry participants, but also the Australian and global community. To reduce this support would be counter to the government's own national priority to enhance productivity growth. In fact, this submission presents strong arguments for increasing this support.

#### ***2.1.1 Rural R&D generates spillovers that benefit the wider community***

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MLA's RD&E outcomes deliver benefits to the industry and the wider community. The benefits that flow to the wider community include: spatial diversification of the Australian population, enhanced global food security, public environmental benefits, and maintenance of Australia's knowledge capacities.

##### ***Spatial diversification of the Australian population***

The Australian red meat and livestock industry is made up of approximately 70,000 producers and 300 processors covering about 50 per cent of Australia's landmass (approximately 385 million hectares). The Australian red meat and livestock industry creates employment for approximately 175,000 people and the majority of these jobs are based in rural areas.

Over two-thirds (68.6 per cent, ABS) of Australia's population resides in major cities which continue to grow at a higher than average rate than populations in rural and remote Australia. This concentration of Australia's growing population in urban centres creates strain on the Australian economy which is a significant challenge facing federal, state and local governments. Quantifying the cost of urban traffic growth and congestion is one indicator of the cost of urban population concentration in Australia.

In 2007 the Bureau of Transport and Regional Economics (BTRE) estimated that current levels of traffic congestion impose a theoretically avoidable annual cost on Australian society of between \$5 and \$15 billion. The BTRE estimated that this amount will rise to between \$10 and \$30 billion by 2020.

Agricultural enterprises play an important role in maintaining and expanding rural and regional population centres. Farmers are a significant proportion of the rural population and they support businesses and services in small towns. In fact, while agriculture underpins 12 per cent of GDP when factoring in flow-on economic activity, it is estimated that the farm sector represents more than 40 per cent of the GDP of regional economies. Once multiplier effects are taken into account this escalates to 70-80 per cent in many communities (National Farmers Federation 2010). Feedlots and meat processing plants employ an estimated 40,000 people and they are mainly located in smaller population centres (see Table 2.1). In many rural centres the meat processing plant is among the largest employers (for example, Dubbo). The multiplier effects of farm, feedlot and processor businesses attract other services, in turn generating more rural and regional jobs. The value of vibrant rural communities is realised when businesses establish new operations in regional Australia where the costs of establishing their business is reduced because infrastructure and services are already in place. An example of this has been the expansion of coal seam gas mining in Queensland.

**Table 2.1: Meat processing facilities by population of locality\***

Population of locality	Qld	NSW	Vic	WA	SA	Tas	Total
0-10,000	21	6	3	3	8	2	43
10,001- 20,000	11	4	1	6	3	1	26
20,001- 50,000	5	11	20	5	2	1	44
50,001 and above	14	4	11	0	0	0	29
Number of processors	51	25	35	14	13	4	142

\*Population of relevant LGA

Source: AMPC, 2010

Improving the socio-economic status of rural communities contributes significantly to their health and wellbeing (Chief Health Officer Queensland 2008). By direct and indirect employment of a substantial proportion of people in rural and remote communities of Australia, the red meat industry contributes to the health and wellbeing of these communities. For example, the cattle industry is a major contributor to the economy of northern Australia – providing 5 per cent of jobs in the region (Northern Australian Land and Water Taskforce 2009).

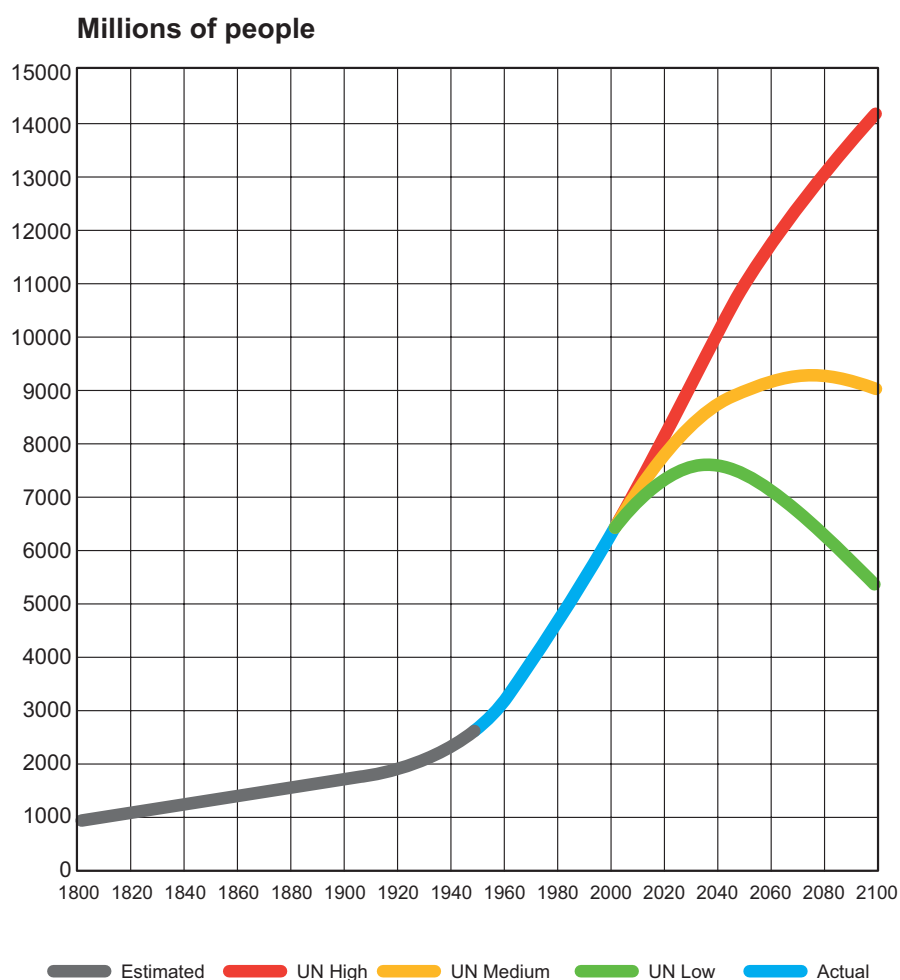
Maintaining and improving the economic performance of Australia's livestock and meat industries directly influences the distribution of Australia's population across the continent and, consequently, mitigates the costs of both urban congestion and supporting rural communities.

## Global food security

Global food security has emerged as one of the biggest challenges facing the world today. According to the FAO in 2009 there were 1.02 billion undernourished people in the world, a sizable increase from the 2006 estimate of 854 million people. Estimates suggest that malnutrition, as measured by stunting, affects 32.5 per cent of children in developing countries. More than 70 per cent of malnourished children live in Asia, which is a part of the world closely connected with Australia. The world population continues to grow at a rapid pace (see Figure 2.1) and it will become significantly more challenging to meet the food requirements of this growing population.

With the escalation of global food prices through 2007 and 2008, the issue of food security, both globally and domestically, attracted considerable public and policy attention. As pointed out by Sheales and Gunning-Trant (2009), another food crisis will only be avoided if a concerted effort is made by all governments to raise global food supply. This places a responsibility on all governments, especially those in the developed world, to invest in agricultural productivity. The responsibility of Australia in contributing to global food security has been recognised extensively by the current government, including in the response to the 2020 summit.

**Figure 2.1: The increasing global population**



Source: UN projections and US Census Bureau historical estimates

Agricultural productivity gains have both a direct impact on Australia's ability to produce more food for the growing world population and an indirect impact through the spillovers from Australian RD&E to other countries, especially those in the developing world. Australian agricultural research has long made a major contribution to welfare of poor people in developing countries through: training of their agricultural researchers; delivery of research by Australian researchers in developing countries; and by spillovers of technologies and information from research conducted primarily to benefit Australian farmers. Indeed, this provides one of the most effective forms of aid to developing countries, whose economies are predominantly rural.

Government support for agricultural research is consistent with Australia's policy to provide development aid to developing countries. The Australian Government's 2010-11 budget allocates \$4.3 billion to development assistance, with \$292 million of this is earmarked for rural development. The Australian Centre for International Agricultural Research (ACIAR) is one of the main channels through which benefits from Australian agricultural research are delivered to developing countries. Other channels include direct contacts between Australian agricultural research organisations and developing countries, and contributions by Australian researchers to the Consultative Group on International Agricultural Research Centres (CGIAR) around the world, such as ICARDA, ILRI, IRRI and CIMMYT.

Not surprisingly, most of the benefits from Australian RD&E in the red meat industry have flowed to developing countries with extensive livestock production industries. For example, the Australian industry's Meat Standards Australia (MSA) program was used in an ACIAR project in South Africa to improve demand for a beef supply based on indigenous breeds. BREEDPLAN (see Box 2.1) has been implemented in a number of developing countries including Namibia, Thailand, The Philippines and South Africa – as well as South American countries.

### **Box 2.1: BREEDPLAN**

BREEDPLAN is a modern genetic evaluation system for beef cattle breeders. It is based in Australia, with clients worldwide. BREEDPLAN offers bull breeders the potential to accelerate genetic progress in their herds, and to provide objective information on stock they sell to commercial breeders.

BREEDPLAN technology is kept at the leading edge by continuous research. It uses the world's most advanced genetic evaluation system (based on best linear unbiased prediction (BLUP) technology) to produce estimated breeding values (EBVs) of recorded cattle for a range of important production traits (eg weight, carcass, fertility). BREEDPLAN delivers additional on-farm returns totalling up to \$20 million each year through improved growth rates, carcass composition, feed efficiency and maternal ability.

Supported by Meat & Livestock Australia, the BREEDPLAN software has been developed by the Animal Genetics & Breeding Unit (AGBU), which is a joint venture of the University of New England (UNE) and NSW Department of Primary Industries (NSW DPI). Marketed by the Agricultural Business Research Institute (ABRI), BREEDPLAN has been implemented as the national beef recording system in Australia, New Zealand, Namibia, Thailand and The Philippines, and its use is also increasing in the United States, Canada, United Kingdom, Hungary, South America and South Africa.

The benefits of contributing to global food security through rural RD&E are not limited to the humanitarian impact achieved through higher food productivity. There are also human health, trade and security benefits of reducing food insecurity.

Australia is a trade dependent country, and it benefits significantly from certainty in the global trading environment. Food insecurity can have detrimental impacts on trade because it can lead to an increase in trade barriers. Countries facing food security concerns often try to impose price controls and export restrictions to manage the short-term problem. An example of this in the meat sector occurred in November 2005 when the Argentinean Government raised beef export taxes. The following March (2006) they introduced a ban on beef exports. While in the short-term Argentina's actions reduced supply competition against Australian beef exports, the implementation of ad hoc trade barriers has a negative impact on the trading environment.

Australia is surrounded geographically by developing countries. Maintaining food security in the region also has a role to play in maintaining security in the region.

While public support for rural RD&E cannot alone solve future food security challenges, it makes an effective and efficient contribution to the issue in the medium to long-term. While short-term crises require humanitarian aid, equipping developing countries with proven tools to improve their agricultural productivity has the potential to deliver a longer lasting solution.

### *Environmental and biosecurity benefits*

Approximately 50 per cent of Australia's landmass is dedicated to cattle and sheep production. Cattle and sheep producers have a strong relationship with the land and they understand that their future viability requires a sustainable approach when utilising the environment as a resource.

Some rural research provides public benefits for the environment and natural resources, including biodiversity, threatened species, surface water, groundwater and climate change. There is a clear justification for governments to contribute to the funding of this research.

There is also a case for governments to continue investing in productivity-oriented research in order to enhance the effectiveness of its investment in environmental research. Over the past 20 years, there has been a shift in relative emphasis from productivity-oriented rural research and extension, towards research and extension emphasising conservation of the environment and natural resources. However there is a risk in public research emphasising the environment without sufficient regard to creating opportunities for improving agricultural productivity. In order to persuade farmers to adopt environmentally-friendly farming practices, it is necessary for the government agencies promoting those practices to have credibility in the eyes of farmers. Pannell et al. (2006) highlight the crucial role that credibility plays in determining the effectiveness of extension efforts. If rural R&D is not considered sufficiently relevant by farmers, such credibility will not be achieved.

It is now accepted that 'locking land up' is not an effective environmental management technique – instead good natural resource management should involve interacting positively with the environment. An example is the control of noxious weeds. If left unchecked, noxious weeds harm biodiversity, the natural environment and water quality. The annual economic cost of weeds in the Australian agricultural sector is \$4 billion and it is estimated that the annual impact of weeds on nature conservation, tourism and landscape amenity is a similar magnitude (National Resource Management Ministerial

Council 2007). It is the responsibility of the occupier of the land to control noxious weeds. Producers benefit from managing noxious weeds as weeds detract from productivity and land value. Producers that are actively managing weeds are also motivated to control weeds on adjoining public lands like road verges. The effective management of noxious weeds involves all land managers in the region controlling their weeds – if one land occupier successfully manages their weeds, then this reduces the cost of control on adjoining land and vice versa. Governments allocate significant taxpayer dollars to the control of weeds on public lands. For example, each year approximately \$20 million is spent on weed control in conservation areas. While spraying is the most common approach for controlling weeds, MLA is investing in the development of biological controls (see Box 2.2). Biological controls are more effective at managing weed populations across large tracts of land and are less reliant on the effective action of a disparate group of land occupiers. Therefore, producers' actions to control noxious weeds can provide a public benefit by controlling the weeds on their land at little or no cost to the government. In the case of biological controls, the investment of levy and government funding has the potential to significantly reduce the future cost of noxious weed control on public lands.

### **Box 2.2: Noxious weeds R&D**

Biological control offers the only long-term solution to many invasive weed species, but is high risk, long-term and expensive research. It first involves studying the ecology of each invasive weed species in its country of origin, and identifying the diseases or insects that prevent it from being an invasive weed in that habitat. Likely control agents are then collected, studied locally for impact, and if promising as a potential control agent, for ease of propagation. The next stage involves importation into quarantine facilities in Australia, synchronising the life cycle to southern seasons and testing against non-target plant species. The final stage, after approval to release, involves propagation and distribution. Each stage has a high failure rate and the whole process rarely takes less than a decade before significant release of control agents can occur.

Since 2007 MLA has invested over \$1.7 million in preliminary research to identify biological control agents for prickly acacia, bellyache bush and parkinsonia, all weeds with the potential to invade large areas of northern Australia. In addition, another \$1.1 million has been committed to understanding the ecology of, and finding better chemical solutions for a number of other weed species, including rubber bush.

Over the same period MLA has invested over \$1 million in research into the biological or integrated management control of southern invasive weeds of national significance and concern to landholders, including Paterson's curse, silverleaf nightshade, serrated tussock and prairie ground cherry.

While there are some projects in MLA's RD&E portfolio where environmental benefits are the unintended consequences of projects focused on productivity improvements, generally project design has shifted to specifically seek joint economic (productivity), environmental and social outcomes. The Wambiana grazing trial is an example of a project that was initially pursued for predominantly environmental purposes. It was a response to rising concerns about the impact of water quality on the Great Barrier Reef (GBR). The Wambiana grazing trial (see Box 2.3) informed the development of 'best practice' grazing management practices that have been widely adopted by producers leading to a reduction in soil erosion and improved water quality in the GBR.



### **Box 2.3: Wambiana grazing trial**

Current increases in the rate of sediment and nutrient delivery to the GBR lagoon, if maintained, are likely to adversely impact near-shore reefs and seagrass beds (Cogle et al. 2006). Grazing is a major land use in the drier catchments of the GBR – the Burdekin, Fitzroy and Burnett-Mary – and grazing is assumed to be a significant source of sediments and nutrients reaching the lagoon in these catchments.

Located in the Burdekin catchment, the Wambiana grazing trial helped identify the most cost-effective grazing strategies for maintaining good land condition and minimising soil-erosion risk. A key finding of the trial was that improved grazing management can reduce hill slope sediment and nutrient run-off from paddocks by up to 70 per cent in a relatively short time.

The trial provided knowledge on the key processes leading to sediment and nutrient loss from grazing properties; documented the consequences of landscape rehabilitation in terms of improved water quality; provided tools for setting targets; and identified management actions that minimise erosion risk and sustain productivity. These management practices enable producers to increase profitability by improving the quality and hydrological condition of their pastures. These outcomes have been a key input into the National Action Plan for Salinity and Water Quality (NAPSWQ), the Reef Water Quality Protection Plan (Reef Plan) and the Reef Rescue program.

Australian livestock producers have a strong relationship with the land and they understand the interrelationship between natural resource management (NRM) and maintaining sustainable agricultural production. Public and levy funding has enabled the identification of potential areas for improvement to NRM and the development of new tools for better NRM. While producers pride themselves as being environmental stewards with a propensity to make environmental improvements, their ability to do this is limited by the tools they have available. However, if public support for MLA RD&E was reduced, it would have a negative impact on NRM as fewer management practices with environmental benefits would be developed and adopted. Further, if the current public support appropriated to RDCs was diverted to public research institutions, there would be a risk of lower adoption rates due to the credibility issues already discussed.

#### *Gains that flow to consumers*

RD&E generated productivity gains in the red meat and livestock sector deliver significant benefits to consumers. For example, for an R&D outcome that delivers a 1 per cent cost reduction in lamb production, 615 per cent flows to consumers and 24 per cent flows to producers (Mounter et al. 2008). Similar benefits to consumers from RD&E have also been estimated in the cattle industry. For example, in the case of an R&D outcome that delivers a 1 per cent cost reduction in the production of grassfed cattle, 64 per cent of benefits flow to consumers and 28 per cent flow to producers.

**Table 2.2 Economic benefits (\$ million) and distribution of total benefits (%) to various industry sectors from a one per cent cost reduction in lamb production resulting from any farm technology that reduces the cost of producing lambs**

	\$ million	%
Producers	2.19	23.72
Domestic consumers	2.85	30.82
Overseas consumers	2.83	30.63
Other (processors, retailers etc)	1.38	14.83

Source: Mounter, Griffith, Piggott, Fleming & Zhao, 2008

**Table 2.3 Economic benefits (\$ million) and distribution of total benefits (%) to various industry sectors from a one per cent cost reduction in cattle grass-finishing resulting from any farm technology that reduces the cost of producing grassfed cattle**

	\$ million	%
Producers	3.69	27.6
Domestic consumers	7.38	55.4
Overseas consumers	1.20	9.0
Other (processors, retailers etc)	1.07	8.0

Source: Zhao, Griffith & Mullen, 2001

The benefits that flow to consumers from productivity improvements in food production are generally greater than the case for non-essential industrial goods and services. This is because the price elasticity of demand for food items is more flexible compared to manufacturers. Therefore when the supply curve shifts as a result of adopting a cost-saving technology –consumers benefit to a greater extent from innovations in the food sector versus the manufacturing sector. This is because the ratio of consumer surplus versus producer surplus is higher for food items versus manufactured items.

Some of the consumer benefit is captured by producers because lower prices drive demand for the product. However, RD&E in the red meat and livestock industry has helped deliver more than a plentiful and affordable array of red meat products. It has also highlighted the important role of red meat in the Australian diet and enhanced the food safety and eating quality of Australian red meat. For example (see further details in Box 2.4):

- By funding research that explores the connection between red meat and nutrition, MLA has contributed to a growing body of evidence which suggests higher protein, low fat diets may help to prevent and manage important public health concerns such as obesity and diabetes. MLA funded important research which contributed to the development of the CSIRO total wellbeing diet. More than 540,000 Australian have lost weight on this diet.
- The risk of illness and death from listeriosis from red meat consumption has been reduced. This equates to a \$60 million consumer benefit and \$281 million social benefit over 30 years.
- The increase in numbers of eligible domestic trade cattle (currently approximately 43 per cent) being MSA graded has improved the eating quality of Australian beef by providing a tenderness guarantee.

## **Box 2.4: Enhanced nutrition, safety and eating quality of Australian red meat**

### **Nutrition – CSIRO total wellbeing diet**

Launched in 2005, the total wellbeing diet (TWD) was based on CSIRO research including an MLA-supported study that demonstrated a higher protein, low fat approach to weight loss was effective.

Research tested the effectiveness of diets in overweight women prone to metabolic syndrome – a disorder that more than half of the Australian population is at risk of developing which increases the threat of type 2 diabetes and cardiovascular disease. A comparative trial showed that a higher protein, low fat diet was more effective than a high carbohydrate, low fat diet in obese women with high blood triglyceride levels (Noakes et al. 2005). A 12-month evaluation confirmed that a significant proportion of women who combined a protein enriched eating plan with exercise could maintain long-term weight loss.

Launched initially by MLA in *The Australian Womens Weekly*, publication of *The CSIRO Total Wellbeing Diet* in book form sold more than one million copies and approximately 547,000 Australian (3 per cent of the population) have lost weight on the TWD.

### **Food safety**

MLA's investment in predictive microbiology generates significant consumer and social benefits. MLA's predictive microbiology project has provided an inexpensive, effective and flexible method of validating processing techniques, minimising overall costs required to achieve higher food safety standards. Prior to implementing the predictive microbiology system, events that had the potential to affect meat safety and quality, for example a refrigeration breakdown, involved a substantial outlay of funds to undertake additional testing to verify that the product was fit to enter the food supply chain. Predictive microbiology has hastened the verification process and significantly reduced compliance costs. This investment has reduced the risk of illness and death from listeriosis, and has produced positive flow-on effects for the Australian economy. The program is projected to deliver \$60 million worth of benefits to consumers over 30 years and the social benefits arising from predictive microbiology are estimated at \$281 million over 30 years (CIE 2009).

### **Eating quality**

The industry's grading system, Meat Standards Australia (MSA), can predict the eating quality of a cut of beef given the animal's history, meat processing methods and the intended use of the beef. The development of MSA required R&D effort along the supply chain to investigate all the practices on-farm, during transport, at the saleyards, and during processing and storage that have an impact on quality. This R&D effort informed the development of an integrated quality system that covers all participants in the supply chain. MSA beef is forecast to generate \$932 million in red meat industry added value. This is in addition to \$3.4 billion net benefits to the community including measurable flow-on effects such as a higher skilled and safer workforce, higher incomes flowing from increased red meat production, and consumer wellbeing measured by increased consumer satisfaction (CIE 2007).

### ***2.1.2 Unique attributes of the agricultural sector cause a high prevalence of market failure in the rural RD&E marketplace***

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While the ‘public good’ spillovers from rural RD&E are, by themselves, justification for public support, there is also a high prevalence of market failure in the rural RD&E marketplace caused by the unique attributes of the agricultural sector.

#### *Structure of the Australian agricultural sector*

The Australian cattle, sheep and goat industries are dominated by small and medium-sized enterprises. This structure delivers challenges, including: free rider issues and lack of scale (effective RD&E outcomes often require physical and temporal scale to detect meaningful results). To a large extent, these issues are effectively addressed through collective action, which in the case of the livestock industry is in the form of a compulsory levy. While the compulsory levy provides for collective action, public funding underpins the necessary ongoing industry support for the compulsory levy.

#### *Inability to access the R&D tax concession*

Take-up of the Australian Government’s R&D tax concession is negligible in the livestock production sector. Many family farms cannot access the tax concession because they are sole operators or partnerships, making them ineligible. The structure of the livestock industry poses another challenge. Because collective action is the most effective approach to rural RD&E, individual enterprises in the livestock industry have little choice but to pay a compulsory levy instead of undertaking their own R&D expenditure.

The Australian Government provides support to Australian businesses through tax concessions on R&D expenditure because they recognise the relationship between innovation and economic development. The agricultural sector receives this support through the government matching mechanism rather than as a tax concession.

#### *Long time lags between conducting R&D and the flow of benefits to farmers*

The long time lag between the conduct of agricultural research and the flow of benefits to Australian farmers is an important reason why government support is justified. There are several components of the lag: a short lag between paying the levy and the research funds being allocated; the lag while research is actually conducted to a point where an adoptable product is available (approximately 5–20 years); and the lag to adoption of new farming technologies or practices (often a decade or more – Rogers 2003). Then once benefits begin to be realised, they continue to be generated, typically for decades.

Pardey and Alston (2010) note that:

*The evidence for these long lags is compelling. One form of evidence is the result of statistical efforts to establish the relationship between current and past R&D spending and agricultural productivity. The dozens of studies done to date indicate that the productivity consequences of public agricultural R&D are distributed over many decades, with a lag of 15 to 25 years before peak impacts are reached and continuing effects for decades afterward. (Pardey and Alston 2010, p.10).*

Alston et al. (2010) conducted a new assessment of the lag lengths, using newly constructed data sets for US state-level productivity over 1949–2002 and US federal and state spending on agricultural RD&E over 1890–2002. They estimated that the peak impact of US agricultural research on productivity occurs 24 years after research investment, and that the research continues to have an impact for 50 years. There has

been no comparable study for Australia, but there is no major reason to expect the result to be different.

For some natural resource management issues, the lags are likely to be even longer due to slow natural processes. For example, management of dryland salinity is subject to time lags due to physical processes of groundwater movement that can take 10 to 20 years in favourable cases, and over 100 years in unfavourable cases (Ridley & Pannell 2005).

The consequence of such long time lags is likely to be substantial under-investment in research by the private sector. Consider farmers faced with choosing an appropriate level of levy to pay. Given that the median age of farmers is now approaching 60, the majority of benefits generated by research funded by current levy payers will not flow to those levy payers, but will accrue to subsequent generations of farmers. Even a 15–25 year lag will mean that the benefits will not flow to most current farmers. Benefits generated 30, 40 or 50 years into the future will be of little consequence to very few current farmers.

In the past, when there was a stronger culture of farms being handed down from one generation to the next – many farmers would have had a motivation to contribute to research with long-term payoffs – but these days there is a much higher likelihood that, following retirement of a farmer, the farm will not be taken up by his or her children.

It is important to note that the discounted net present value of agricultural research is generally high despite these long time lags.

### *Information failure*

Although farmers benefit greatly from agricultural research, relatively few have substantial expertise or experience in the conduct of agricultural research. Many are involved in on-farm trials of new technologies or systems, but these only provide a narrow perspective on the R&D process, as such trials usually occur late in the R&D process. The important links between basic or strategic research and applied research (Pannell 1999) would not be clear to many farmers. Evidence about the high economic returns on investment (ROI) in agricultural R&D is largely unknown to farmers. Farmers tend to express a preference for highly applied research and extension addressing short-term problems, whereas evidence indicates that basic-strategic research is likely to provide greater rates of return in the long-term (Huffman & Evenson 1993). The long time lags involved, the variation in success of research projects, and uncertainty about where particular technologies or information come from, would all contribute to the difficulty that farmers have in fully appreciating the long-term benefits of agricultural research. All of these factors are likely to contribute to under-investment in agricultural research by the farming sector. Even research that will generate benefits rapidly is likely to be under-appreciated by farmers. Thus, the levy system, while it addresses the problem of free-riding well, does not deal with all reasons for under-investment.

### *Challenges to protecting agricultural innovations*

The existence of public good spillovers does not in itself justify public investment if the existence of the spillover doesn't cause under-investment. For example, many private pharmaceutical companies commercialise drugs with significant public health benefits. While governments (including Australia) support medical research with public funds, there are many examples in the health sector where there is sufficient incentive for private investment. In the case of pharmaceutical companies this is largely due the intellectual property rights (IPR) protection afforded by drug patents.

There are examples in the red meat and livestock industry where sufficient IPR protection for private investment exists. This is mainly in the animal health, agricultural chemical and farm equipment areas. However, it should be noted that IPR protection is not sufficient in itself and a significant potential market is also required to attract private investment. For example, while the IPR of new meat processing equipment can often be protected, overseas equipment manufacturers do not typically adapt equipment to suit the Australian market because of its small size (only around 160 processing plants of sufficient size) and the Australian market is not generally considered large enough to support the emergence of local specialised equipment manufacturers.

MLA focuses RD&E efforts on areas where there is little or no incentive for private investment, however, there are some examples where MLA investment encourages private investment. This has occurred in the animal genomics area, where in both sheep and cattle MLA and government funds have supported a broad range of RD&E that has helped create a more favourable environment for private investment. For example, breed societies are investing private funds in genetic improvement through the MLA Donor Company and private companies are investing their own funds to develop products which utilise gene marker assisted genetic selection technology.

#### *Divergence between public and private attitudes to risk and time*

For individual farmers, a decision to support an increased R&D levy can be a risky decision, particularly in view of the issues discussed above in relation to information failure and long time lags. As most farmers are risk-averse (see Abadi Ghadim and Pannell 2003 and references cited therein), they are likely to support lower levies than would be optimal from a risk-neutral perspective. On the other hand, Arrow and Lind (1970) show that government decision making should not consider risk aversion except for investments that are large relative to national income. Thus, the optimal level of investment in agricultural R&D from the perspective of the Australian community as a whole is likely to be greater than the aggregate of individual decisions by farmers, even if attention is focused solely on research that only benefits farmers.

Similarly, it might be expected that farmers' time preferences would not coincide with the social discount rate, again resulting in lower investment in R&D by farmers than would be socially optimal.

These are two of a number of reasons why farmers may choose to under-invest even in productivity-oriented R&D. The evidence that marginal rates of return to agricultural R&D are high indicates that farmers do, in fact, under-invest.

#### *Lack of incentives for private research companies*

The discussion above indicates that there is likely to be a divergence between the socially-optimal level of investment in rural R&D and the level that farmers will voluntarily choose to contribute, even if free-rider problems are dealt with by the use of compulsory levies (assuming that the level of levies has to be agreed by farmers). This would not be a problem if private research companies were likely to step in and fill the gap. However, this appears unlikely to occur, for several reasons:

- Many of the benefits generated by rural R&D cannot be captured by private research investors. Examples include environmental benefits, consumer benefits, R&D that produces information that is non-excludable, R&D that produces technologies for which intellectual property rights are imperfect (eg plant varieties that can be cultivated from farmer-grown seed).

- The long time lags before benefits from agricultural R&D are realised, reduces its attractiveness to private investors.
- The riskiness of investment in particular agricultural R&D projects, or small programs of research, would also reduce its attractiveness to private investors.

The lack of incentive for private investment is not limited to pre farm gate. Processors and feedlotters are margin businesses that are fiercely competitive and investment decisions are therefore generally based on very short-time horizons. The high degree of regulation in the meat processing sector is a disincentive for private investment by processing firms. There is a standardisation of technologies across the processing industry. Individual processors are unlikely to invest in the development of many innovations because the regulatory environment requires most new technologies to gain approval before use. This environment is more suited to collective rather than individual action.

Producers benefit from improvements to processing efficiency because Australian processors become more globally competitive, in turn they demand more livestock and this increases the price they pay. In addition greater efficiency in the supply chain over time reduces the marketing margin between livestock prices and retail prices – increasing the opportunities for greater profitability along the chain.

### ***2.1.3 Other justifications for public funding***

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#### ***Maintaining core rural research skills and infrastructure***

MLA invests in the development of scientists and researchers to build Australia's body of research and develop human capabilities. Investing in red meat RD&E not only benefits the industry directly, it also contributes to the broader bank of scientific knowledge in Australia. In 2008-09 MLA supported 21 researchers and invested \$740,992 through its postgraduate and scholarship program. More than 220 postgraduate students have been supported through MLA and its predecessor organisations since 1975. The scholarship program supports students undertaking postgraduate studies for the three years of their candidature. Students' projects are varied and cover a wide range of industry-related topics which are relevant to both on-farm and off-farm innovation.

While MLA does not directly invest in infrastructure for R&D, MLA's long-term commitment to specific areas of research has created enough certainty to enable R&D providers to invest in infrastructure. For example, MLA investment in genomics R&D in collaboration with CSIRO, universities and state DPIs has enabled Australian scientists to play a leading role in the development of genome maps and genomics tools for beef and sheep. This ongoing support for genetics research assisted in the establishment of the Animal Genetics and Breeding Unit (AGBU) at the University of New England, Armidale.

The Australian red meat and livestock industry is also increasing its role in biosecurity measures. During the height of efforts to eliminate Brucellosis and Tuberculosis from northern Australia, significant Australian Government resources and infrastructure were deployed. As these diseases have been brought under control, government resources and infrastructure have been significantly reduced. More and more Australian producers are becoming the frontline defence against new animal disease outbreaks and playing a vital role to Australia's biosecurity.



## 2.2 The positive relationship between government funding and industry levy contributions

### 2.2.1 The government matching dollar underpins support for the compulsory levy

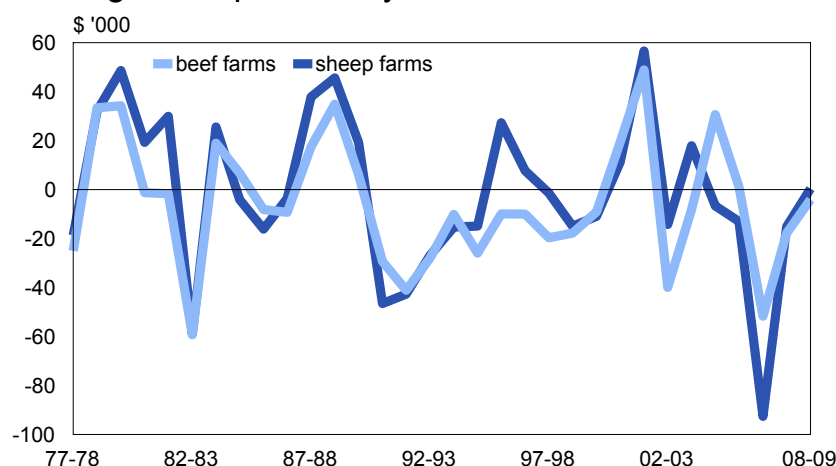
Public investment in RDCs does not crowd out private investment. To the contrary, it supports and encourages private investment.

While the Australian red meat and livestock industry has a number of compulsory transaction levies, stakeholders determine the level of these compulsory levies.

In the Australian beef and lamb industries the national average rate of return (excluding capital appreciation) is 0.6 per cent and 1.6 per cent, respectively. This extremely low rate of return affects producers' incentive to undertake long-term investments and as already discussed the R&D levy is a long-term investment because of the long time lags associated with rural RD&E. Another challenge facing livestock producers is the volatility of world commodity prices which affects their profitability from year to year. Many factors – including climatic conditions, world supply of, and demand for protein products, and exchange rates – affect world meat prices. Industry support for compulsory levies becomes even more challenging in years of low profitability. The Government matching dollar is a strong incentive for maintaining support for compulsory levies amongst producers, lot feeders, processors and live exporters. In the absence of the government matching dollar producers would be more likely to vote for a decrease in levies during periods of lower profitability.

**Figure 2.2**

Average farm profitability



Source: ABARE

Furthermore, because of the linked nature of the industry and community-wide benefits that flow from rural R&D, industry cannot justify funding RD&E independently where substantial benefits are not captured by the industry. In other words, even a well functioning compulsory levy system will not overcome the full extent of the market failures.

The co-investment (public and private funding) in MLA's RD&E portfolio enables a balanced approach across the RD&E spectrum. MLA invests in a mixture of strategic basic, strategic-applied, development, capability building, adoption and commercialisation projects which involve both shorter and longer-term projects. MLA's portfolio would likely contract to more applied, short-term projects in the absence of public funding.

### ***2.2.2 Importance of strong linkage between levy payer and R&D management***

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Separate meat and livestock RDC organisations exist to manage processor levies (AMPC) and live exporter levies (LiveCorp). These organisations are committed to maintaining a strong linkage between the levies processors and live exporters pay and the projects these levies fund, ensuring continued strong support for investment by these sectors in RD&E.

While the governance structures of MLA, AMPC and LiveCorp are necessarily distinct, there is close collaboration on strategy development and RD&E project management and implementation. MLA facilitates the matching of government funding for all three RDCs and, where appropriate, administration functions are centralised resulting in significant efficiencies.

## **2.3 The inextricable link between public and private benefits generated from rural RD&E supports the RDC (co-investment) approach**

### ***2.3.1 Ensuring RDC RD&E outcomes are consistent with public and private priorities***

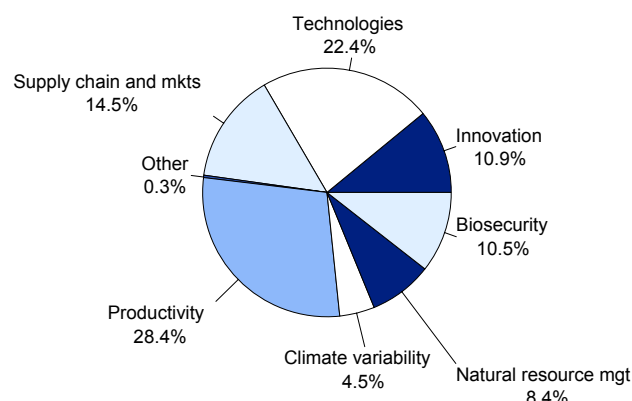
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MLA has multiple stakeholders and MLA's RD&E program must respond to their respective priorities and deliver value for their investment. Government, as a stakeholder, is looking for public-good outcomes across a range of issues, and industry stakeholders are seeking improvements to their competitive advantage.

MLA responds to the government's requirements by aligning R&D projects with the National Research Priorities and Australian Rural R&D Priorities as required in the Statutory Funding Agreement (SFA) between the Australian Government and MLA. The government priorities are an input into the industry consultation processes along with the Meat and Livestock Industry Strategic Imperatives which are drawn from the *Meat Industry Strategic Plan*. The industry consultation process includes an annual industry strategic planning process, consultation with peak councils, industry feedback and the MLA Board planning process. Taking into account the industry consultation processes, priority analysis and MLA budget projections a list of RD&E priorities are developed which form the foundation of the MLA strategic plan and subsequent annual operating plans.

Each year MLA reports its expenditure against Australian Rural R&D Priorities in the annual report (see Figure 2.3)

**Figure 2.3**  
**MLA expenditure 2008-09**



The SFA and National and Rural Research Priorities are the two mechanisms that the Australian Government has at its disposal to exercise significant control over MLA's RD&E investments. It is the opinion of MLA that the Government has seen value in allowing RDCs significant flexibility on the funding of RD&E programs. This flexibility has yielded benefits to industry and the wider community. This view is consistent with the PC's conclusion that the National Research Priorities "provide sufficiently meaningful signals of areas for research" and it is important that they are not too prescriptive as this could lead to a pattern of R&D investment that reduces the overall returns to the community (PC 2007). However, if the government wished to be more prescriptive in directing RD&E funding priorities the SFA and government priorities could be used to achieve this.

### ***2.3.2 The benefits of jointly funding RD&E to achieve both industry (private) and community-wide (public) benefits***

In Section 2.1 it was argued that rural R&D generates significant spillovers that benefit the broader community. The interrelationship of the industry and wider community benefits is such that separating their delivery is problematic. Even if separation could be achieved, the synergies that are generated by delivering them simultaneously can make a joint approach more cost efficient.

Industry-specific RDCs provide a unique opportunity to develop and deliver integrated innovation strategies across a broad range of areas which generate both public and private benefit. A significant proportion of 'production' RD&E projects actively and passively incorporates consideration of impacts on the environment, human capital, animal welfare, food safety etc. Where this occurs, the government/community achieves the triple bottom line (TBL) goals at a lower cost. To put it another way – integrated (multi-goal) RD&E generates TBL benefits in excess of what would have been achieved by having the same funds invested in separate single purpose programs. For example:

- RD&E focussed at increasing productivity and competitiveness delivers benefits to industry through improved profitability. Consumers also benefit with more nutritious, safe and abundance of food.
- Natural resource management initiatives benefit producers by delivering more sustainable and efficient production systems, while also making progress on key environmental priorities like climate change. Examples of MLA projects which

have delivered both production and environmental benefits include: Sustainable Grazing Systems program, Grain & Graze and EverGraze (see Box 2.5).

- Through-chain capability building projects have benefited the industry by attracting and maintaining a skilled workforce. The spillover benefits include achieving greater diversity in the workforce and maintaining key science and technology capabilities for the broader benefit of the community. Examples include MINTRAC (see Box 2.5) and the MLA Graduate program.

## **Box 2.5: Achieving private and public outcomes from rural RD&E**

### **Sustainable Grazing Systems (SGS) program**

The Sustainable Grazing Systems (SGS) program was established in 1996 to address the issues of declining pasture productivity and sustainability in the high rainfall zone (>600 mm/year) of southern Australia. SGS was an initiative of MLA, in partnership with producers and researchers across Australia, as well as Land and Water Australia, NSW Agriculture, NRE Victoria, Agriculture Western Australia, the University of Melbourne and the Murray Darling Basin Commission.

The program's goal by June 2001 was for at least 2,000 producers in the high rainfall zone to adopt changes to their grazing systems that enhance profitability and sustainability by at least 10 per cent, with a further 5,000 producers trialling at least part of the recommended changes. Critical elements of SGS included research, skills training and support for producer groups, on-farm trials and demonstrations, and farm-walks for producers to share information and experiences.

Independent surveys confirmed that SGS assisted approximately 8,000 producers to make substantial change to their farm practices – 78 per cent of these yielded financial benefits and 81 per cent yielded sustainability benefits.

### **EverGraze**

MLA is collaborating with the Future Farm Industries Cooperative Research Centre and Australian Wool Innovation in the EverGraze program to expand the use of more profitable and sustainable grazing systems. The target is to increase profits of sheep and cattle enterprises by up to 50 per cent and at the same time improve water management, use of perennials, biodiversity and soil health.

EverGraze is developing and testing new farming systems in different environments across the high rainfall zone of southern Australia. Six research teams at Proof Sites in three states are testing these new farming systems, measuring soil, water, pasture and livestock inputs and outputs, enabling accurate modelling of the impact on catchment outcomes and farm profits. Three sites focus on sown exotic perennial species and three sites are working with existing native perennial pastures. In addition, nearly 4,000 producers, consultants and advisors have participated in the network of Supporting Sites, which are associated with each Proof Site, to trial new grazing practices and perennial systems.

Also as a result of research from the EverGraze program, two new on-farm tools, 20 case studies and fact sheets as well as numerous peer reviewed journal papers have been developed to help producers work out the costs and benefits of using different pasture management methods. An example of this is the EverGraze Feed Budget and Rotation Planner – a calculator that helps plan rotational grazing systems, determine appropriate stocking rates, calculate pasture growth rates, determine how long paddocks will last and calculate the most economical ration for stock.

### **MINTRAC**

The industry's competitiveness, profitability and sustainability require continual improvement of the industry's professional capability. The National Meat Industry Training Advisory Council Limited (MINTRAC) represents the processing, smallgoods and meat retailing sectors on training matters. MINTRAC's role is to improve the skills of workers in the industry through the development and provision of recognised and accredited training from entry level through to senior management. The number of employees undertaking training in the meat sector has increased from 500 trainees in 1998 to over 7,000 in 2003, with a further 2,000 enrolments in non-traineeship courses. Now in the processing sector, 85 per cent of all employees either have a qualification in meat processing or are working towards one (MINTRAC 2006). Training has proven to be a key mechanism for driving adoption of new technology in the red meat supply chain. MINTRAC conducts eligible projects and activities on behalf of MLA funded through Australian Meat Processor Corporation (AMPC) and matching Australian Government funds.

These examples demonstrate how co-investing public and private funding to undertake RD&E that delivers private and public goods is cost effective because of synergies. Additional benefits of this co-investment approach include higher levels of adoption through enhanced industry engagement, greater government control and focus on a common goal.

Realising the community benefits of RD&E requires the uptake of new technologies. Successful uptake depends on producers (or other members of the supply chain) recognising and valuing the commercial benefit of adopting the technology. Pursuing public-good RD&E independently presents a risk of lower adoption rates, for example, trying to convince producers to adopt a new technology that enhances the environment but doesn't improve productivity is a difficult proposition.

The government's provision of R&D matching funds and the compulsory nature of the levy justify government playing a strong role in overseeing the investment of these funds – ensuring that the community receives value for money by the delivery of public goods that are in the national interest.

The co-investment approach facilitates RDC activities that work towards a goal that is consistent with government priorities and have industry endorsement which facilitates smoother and more ready uptake of new R&D. If 'production' and 'non production' RD&E were managed and funded separately, then there is a risk that these separate outcomes could be detrimental to each other. Such would be the case if a 'production' RD&E project delivered improved productivity at the expense of environmental degradation.

### 2.3.3 The unintended consequences of classifying RD&E as either inside or outside the government funding net

The Productivity Commission Issues Paper questioned whether RD&E projects could be classified according to the extent of public benefits generated, potentially resulting in some projects falling outside the government's funding net.

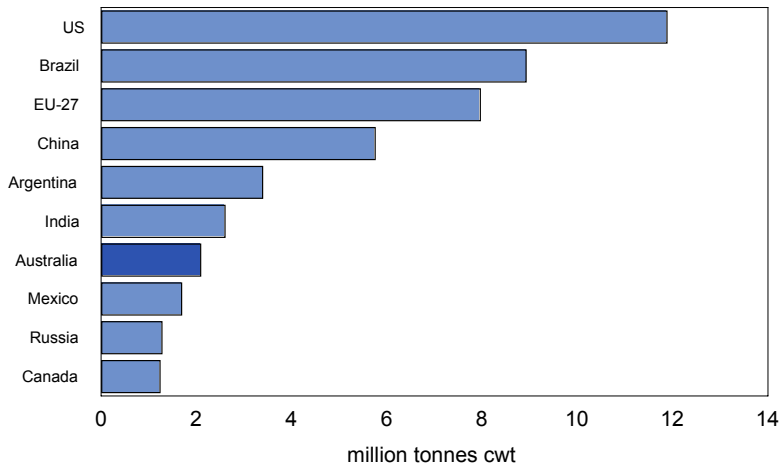
There are significant costs associated with attempting to classify RD&E projects according to public and private outcomes. These costs include: information costs, other transaction costs, opportunity costs and rent seeking costs (Alston et al, 1999). From an economic perspective it is only sensible to pursue such an action if the misallocation costs significantly outweigh the costs of classifying the projects. The majority of MLA's RD&E projects involve intertwined benefits to industry and the wider community, therefore, the costs of classifying and adjusting funding streams would be significant. While the ratio of private:public benefit is not uniform across all MLA RD&E projects, the private and public benefits are balanced across MLA's total RD&E portfolio.

## 2.4 An international perspective

The Australian red meat and livestock industry is an export dependent industry. In 2009 Australia exported 63 per cent of its beef production, 56 per cent of sheepmeat production and approximately 90 per cent of goatmeat production. Australia is also the world's second largest beef and sheepmeat exporter and largest exporter of goatmeat. While Australia is a prominent exporter of red meat, it is a relatively small producer of red meat (see Figures 2.4-2.7). This heavy trade dependence combined with relatively small production base makes the maintenance of global competitiveness the number one priority for the industry.

**Figure 2.4**

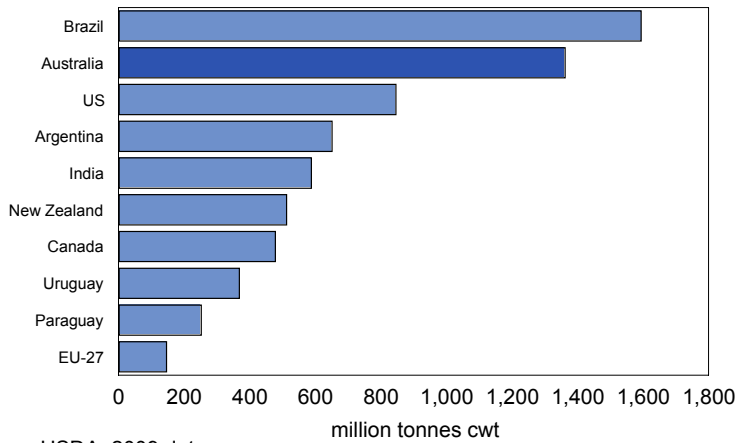
Top ten beef producing countries



Source: USDA, 2009 data

**Figure 2.5**

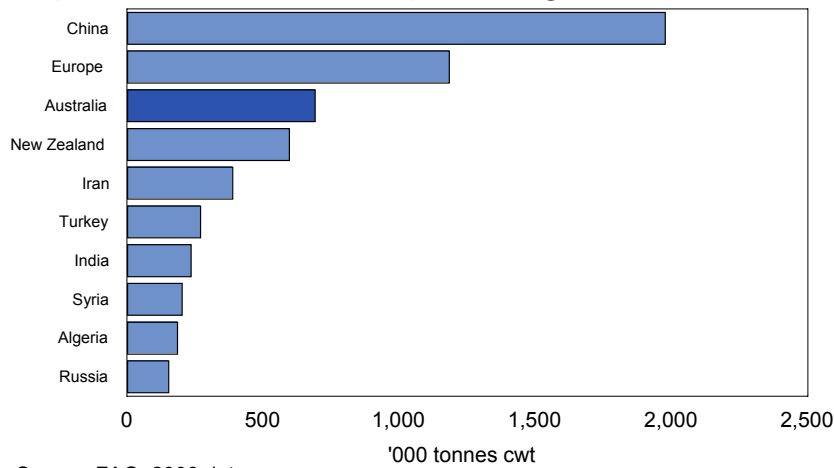
Top ten world beef exporters



Source: USDA, 2009 data

**Figure 2.6**

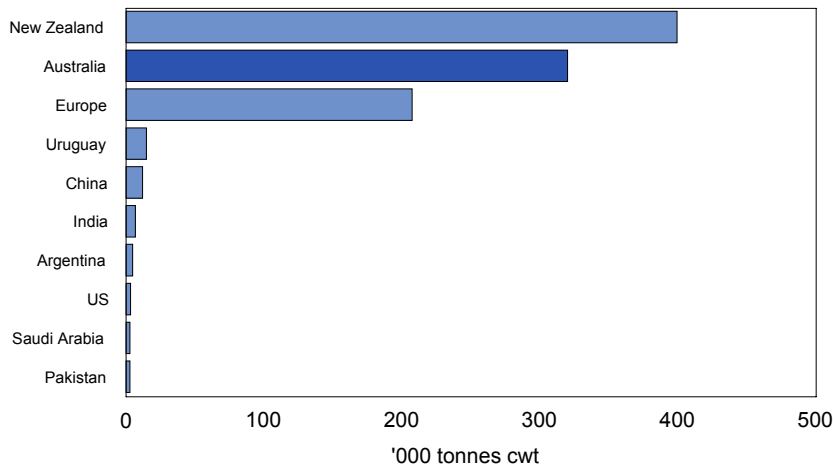
Top ten lamb and mutton producing countries



Source: FAO, 2008 data

## Figure 2.7

### Top ten world lamb and mutton exporters



Source: FAO, 2007 data

The Australian red meat and livestock industry is a staunch supporter of free trade. Australian red meat and livestock exports have to compete globally with exports from other countries that provide high levels of government support through border protection measures and production subsidies. Liberalisation of global beef markets would boost the annual profits of Australian beef producers by A\$427.3 million (CIE 2001)<sup>3</sup>. Liberalisation of global sheepmeat markets would boost the annual profits of Australian sheepmeat producers by A\$88 million (CIE 2003a).

The only ongoing support that the Australian red meat and livestock industry receives from the government is for RD&E. This is classified as 'green box' by the World Trade Organization (WTO) and is considered minimally trade distorting. This support has enhanced the Australian industry's global competitiveness without distorting market signals or leading to a misallocation of resources. Australia's approach of providing R&D support has proven to be an extremely efficient mechanism for maintaining a vibrant red meat and livestock industry.

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<sup>3</sup> The increase in annual profits flowing to Australian beef producers was calculated in US dollars (US\$222.2 million). This was converted to A\$ using the average exchange US\$/AUD exchange rate for 2001, which was 52 cents.



## **3 Funding level issues**

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### **3.1 Determining the appropriate level of total funding**

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The optimal level of investment in RD&E for an industry occurs when the marginal social cost and return of that industry's research portfolio equals other investment options (Charles cited in Simpson et al. 2010). It is generally accepted (Kerin & Watson cited in Simpson et al. 2010) that there are significant challenges in estimating marginal benefits. Therefore, there is no exact science for determining the appropriate level of funding. Furthermore, the ramifications of a change in public funding for rural R&D will not be realised for a significant time period due to the time lag between research activity and the flow of benefits. Therefore, the findings of recent work by Alston et al. 2010 and Sheng, Mullen and Zhao 2010 (cited in PC 2010) that demonstrated a correlation between reduced government spending on agricultural R&D in the developed countries and declines in agricultural productivity growth, is alarming.

Several factors need to be taken into account when determining an appropriate level of funding for rural RD&E. These include:

- Level of innovation required to maintain globally competitive rural industries
- The potential returns on investment (ROI)
- Where total funding includes public funds, it is also appropriate to assess how changes in funding affects community wellbeing

#### ***3.1.1 Maintaining globally competitive rural industries***

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In order for Australia to drive economic growth and improve the living standards for all Australians, individual industries must remain globally competitive (or adjust quickly to changing circumstances). Maintaining the comparative advantage of Australian red meat and livestock exports requires investment in RD&E to deliver productivity growth, improve product quality and integrity and to assist in maintaining market access. In order to compete successfully on the international market Australian exports must have access to markets and the product mix (price, integrity, quality) must meet customer needs.

The global meat market is complex. Trade flows are heavily influenced by the animal disease status of countries and high levels of trade protectionism (in the European Union and North Asia in particular). Australia is in the enviable position of being free from many of the world's major livestock diseases, in particular foot and mouth disease (FMD) and bovine spongiform encephalopathy (BSE), and industry and government investment in RD&E has enabled the development of industry systems to protect Australia's disease-free status and the industry's reputation as a supplier of safe meat products.

#### ***Productivity growth***

In the red meat and livestock industry variables like drought affect productivity year-to-year, however, the implementation of new technologies is required to drive productivity growth over the long-term.

As the world population increases, there is a growing need for more food production. Given the growing scarcity of natural resources like land and water, producing more from less is the only way the food demands of the growing population will be met.

Therefore, it is alarming that there has been a slowdown in productivity growth in the Australian rural sector over the past decade (ABARE 2009) and this slowdown is likely to be exacerbated in future decades if climate change predictions prove to be correct. Many other challenges also stand in the way of Australia's cattle, sheep and goat producers' ability to meet these growing needs. These include:

- The inherently poor soils and low and unreliability of rainfall in our farming regions
- Market access and biosecurity concerns
- Population ageing and labour shortages
- Maintaining international competitiveness (ABARE 2009)

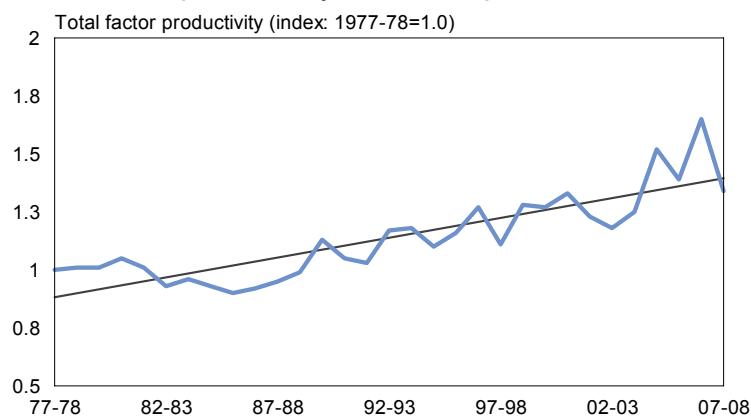
Given these growing needs for productivity gains more rather than less investment in rural RD&E is required. Agricultural R&D still has the potential to continue to deliver productivity growth provided funding can be secured.

*Some suggest that the rate of return to agricultural R&D ought to be expected to decline over time, owing to some loose notion of diminishing returns or the view that the easy problems have already been solved – nature is increasingly niggardly. On the other hand, others have said that new information and biotechnologies offer the potential for an unprecedented technological revolution. [...] there is no evidence that the rate of return to agricultural R&D has declined over time.*

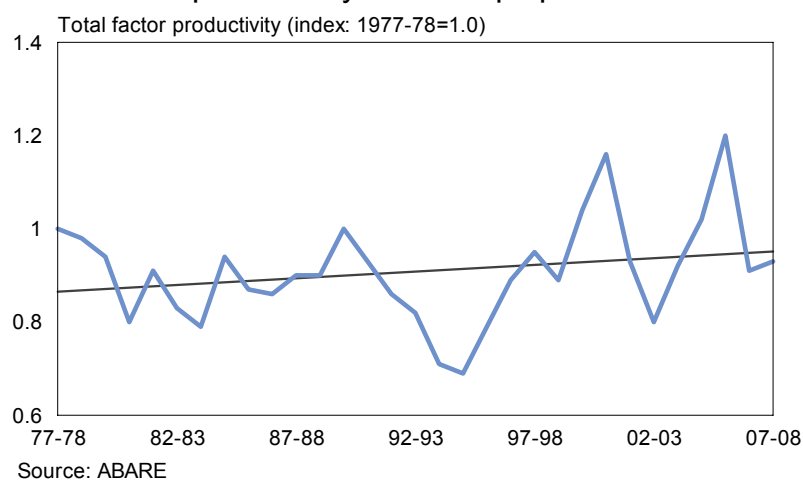
*Source: Alston et al (2000) A Meta-Analysis of Rates of Return to Agricultural R&D*

The Australian beef industry has managed consistent productivity improvement over the past three decades (see Figure 3.1). The sheep industry's (meat and wool) productivity change has been more turbulent in large part due to the changing fortunes of the wool industry (see Figures 3.2 & 3.3).

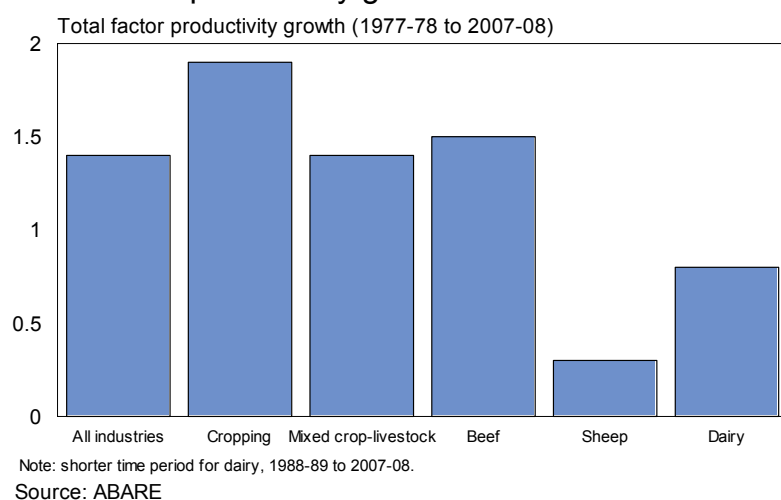
**Figure 3.1**  
Total factor productivity - all beef specialists



**Figure 3.2**  
Total factor productivity - all sheep specialists



**Figure 3.3**  
Total factor productivity growth - broadacre industries



### *Product integrity and quality*

Maintaining the global competitiveness of Australian red meat and livestock exports is more complex than being the lowest cost producer. Industry and government funds have been invested in RD&E to develop world-leading integrity systems. These quality assurance and traceability systems boost customer and government confidence in the safety and integrity of Australian red meat products which assists in maintaining market access and growing demand. The National Livestock Identification System (NLIS) is the cornerstone of the industry's integrity systems (see Box 3.1).

### **Box 3.1: National Livestock Identification System**

The National Livestock Identification System (NLIS) is Australia's system for rapid identification and traceability of livestock. The ability to trace livestock from property of birth to slaughter is crucial to the safety of red meat. NLIS (cattle) was developed in the mid 1990s following a series of damaging meat residue incidents. These incidents highlighted the shortcomings of the then tail-tag system, which was unable to quickly locate and isolate large numbers of individual cattle. In 1999 the European Union (EU) required equivalency with the EU identification systems for verifying that beef products were free from hormonal growth promotants (HGP). NLIS was implemented to provide this equivalency.

The vision for NLIS is that all livestock species requiring tracking and tracing should be hosted on the NLIS database. Sheep and goats have since been included, and negotiations are ongoing with other species. NLIS is utilised for many purposes by all in the supply chain, but the national priority purposes for NLIS are:

- Biosecurity
- Meat safety
- Product integrity
- Market access

NLIS is underpinned by complementary State and Territory legislation, which provides the regulatory framework for the system, and is supported by industry through the SAFEMEAT Partnership, which oversees the Standards for Performance, Business Rules, and Code of Practice. It is this co-operation between all the parties that has made NLIS successful. A subsidiary of MLA, NLIS Ltd, operates the central database on which the livestock movements must be recorded.

Federal Government funding, both in the form of direct grants, and through matching R&D funding, together with industry and State Government contributions, assisted in the development of the NLIS database and infrastructure requirements. The NLIS database, its utilisation of electronic communication and the use of Radio Frequency devices were world's first. A significant effort was required to develop the technologies and software to meet the practical requirements of the Australian industry.

The key to the system of permanent individual identification is the national approach, so that there is one system across the continent, enabling tags to be read, data accessed and movements uploaded regardless of location, to a single database.

Australia's NLIS is seen as the world's most advanced livestock traceability system and this reputation has assisted in maintaining market access and growing demand for Australian beef in export markets. For example NLIS's role in maintaining access to the EU market in 1999.

NLIS, together with the Livestock Production Assurance (LPA) program, has enabled Australia to differentiate its red meat products. For example, key customers in the Japanese market (Australia's most valuable beef export market), prefer Australian beef to competitor beef suppliers because of the industry's integrity systems. One of Japan's largest foodservice group used to source 100 per cent of its beef from the United States, now states (in writing) that it "will not risk the health of its customers" and purchases Australian beef almost exclusively. McDonald's Japan is a further example of an end user which almost exclusively uses Australian beef in their beef burgers.

McDonald's recently conducted a TV advertising campaign which consisted of a 90 second advertisement based solely on Australia's NLIS and LPA food safety systems, so as to differentiate McDonald's brand in the competitive Japanese marketplace.

While Australia currently has world best product integrity systems there is a continuing need to further develop these systems to meet ever more exacting customer and consumer needs.

### *Market access*

The industry works closely with the Australian Government to defend against threats to current market access and where possible improve access conditions. MLA commissions economic research to inform the government of priority areas for market access improvement. The work of MLA and other agricultural organisations equips the Australian Government with the necessary information to pursue the most favourable outcome for Australia in multilateral and bilateral trade negotiations. Since the early 1990s MLA (and previously MRC and AMLC) has maintained the Global Meat Industries (GMI) model with R&D funding. The industry has used this model (and other general equilibrium models) to estimate the potential impact of various trade negotiating scenarios. This model was also used to undertake collaborative projects with like-minded countries. For example, the Five Nations Beef Association (FNBA) has collaborated on a number of economic studies to progress WTO efforts to liberalise the global beef market. The US and Australian lamb industries also collaborated on a study estimating the benefits of liberalising the EU sheepmeat market. While liberalising global red meat markets has a positive impact on the Australian industry, consumers (and taxpayers) also benefit significantly from trade liberalisation; therefore, to the extent that R&D efforts inform a better outcome, the community benefits from RDC efforts on market access.

Significant efforts are focused on multilateral and bilateral trade negotiations, but there are a growing number of technical barriers that are affecting exports of Australian red meat and livestock. As overseas markets come under pressure to reduce their border protection measures, some countries are turning to technical barriers to protect their domestic industries from imports. The Australian industry is in a position to utilise its integrity systems to assist in ameliorating the impact of some technical barriers.

With the growing popularity of bilateral and regional trade negotiations and the increasing number of technical barriers to trade, there will be an increasing demand for market access R&D.

### ***3.1.2 The potential returns on investment (ROI)***

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While equating the marginal social cost and return of MLA's RD&E portfolio is difficult because of the challenges in estimating marginal benefits, another approach that has been recommended to address this issue is to identify those projects in the portfolio of lowest priority, ie marginal priority. If these projects are generating a high ROI, then it can be concluded that the socially-optimal level of investment has not been reached. This approach is consistent with the view that if rural R&D is returning high social and private rates of return, then society is under-investing (Alston et al. 1999).

MLA's ex-ante project assessment procedures ensure that all new investments have the potential to deliver high rates of financial and/or non-financial (ie environmental, welfare or social) returns. Ex-post evaluations indicate that this potential for high rates of financial or non-financial return is, in fact, realised across MLA's R&D portfolio. A detailed description of MLA's approach to evaluation is contained in Section 4.3 but the

summary of the programs that had been evaluated to date (see Table 3.1) represent significant RD&E expenditures that have yielded moderate to high benefit cost ratios. The fact that significant ROI have been generated across the portfolio suggest that further benefits could be generated if funding levels for RD&E were increased.

**Table 3.1: Completed MLA evaluations**

Program	Investment period	Benefit period	Total PV of MLA investment	Commonwealth Funding (%)	BCR value (estimation methodology)
1.1 Enhancing product integrity (Predictive Microbiology)	1996-2006	1996-2026	\$4 million (2006)	50%	<b>11:1</b> (GE model)
1.2 Maintaining and liberalising access to world meat markets	1998-2006	1998-2020	\$50.5 million (2006)	5%	<b>8:1</b> (GE model)
2.1 Improving eating quality	1996-2005	1999-2029	\$223 million (2005)	40%*	<b>5:1</b> (GE model)
2.2 Enhancing the nutritional reputation of red meat	2001-2007	NA	\$43 million (2007)	7%	BCR could not be calculated
2.5 Aggressive promotion in the marketplace (lamb)	1991-2007	1990-2015	\$383 million (2007)	0%	<b>2.2-3.7:1</b> (GE model)
3.1 Increasing cost efficiency and productivity – on farm (lamb)	1991-2007	1990-2015	\$256 million (2007)	50%	<b>1.9-3.4:1</b> (GE model)
3.1 Increasing cost efficiency and productivity – on farm (beef)	2000-2007	2001-2015	\$93 million (2007)	50%	<b>3.4:1</b> (GE model)
3.3 Improving industry and market information	1998-2008	1998-2010	\$45 million (2008)	25%	<b>5.6:1</b>

\* estimate

### ***3.1.3 How changes to overall funding affects community well-being***

Community wellbeing is affected positively in three ways by the impacts of science and innovation:

- Economic growth – impact on gross domestic product
- Environmental benefits
- Social benefits

Rural RD&E generates significant environmental and social benefits. If the magnitude of these benefits could be captured through a quantitative study then funding decisions could be made to maximise these benefits and make sure they are balanced with industry-specific benefits. However, the Productivity Commission acknowledges that insurmountable challenges prevent the calculation of a summary measure for the environmental and social impacts generated by R&D (PC 2007). Despite this the

Productivity Commission accepts that “publicly supported science and innovation have produced important social and environmental benefits”.

Justification for public support for rural RD&E still relies heavily on the benefits demonstrated in case studies. Section 2.1.1 included a discussion of the significant spillovers that flow from rural RD&E to the wider community. Several case studies were provided to demonstrate the social and environmental benefits that are generated by rural RD&E programs. The social benefits included the improved socio-economic status of rural communities, improvements in the safety, nutrition and eating quality of Australian red meat products and the contribution that rural RD&E makes to solving world hunger. The case studies that demonstrated the positive impact of rural RD&E on water quality in the Great Barrier Reef basin and noxious weed control were two examples of the environmental benefits that are generated from rural RD&E.

MLA uses benefit-cost analysis to estimate the economic benefit generated from its RD&E projects. The social and environmental benefits are captured in triple bottom line (TBL) reporting, but not quantified in economic terms. MLA acknowledges that the generation of social and environmental benefits from RD&E are sometimes the unintended consequences of a project that is focussed on increasing productivity, but increasingly it is the result of projects being carefully crafted to deliver a mix of economic, social and environmental benefits.

A major driver of this shift has been the alignment of MLA’s RD&E portfolio with the government’s National Research Priorities (released 2002) and the Rural Research Priorities (first released 2003, amended in 2007). Because of the difficulties in quantifying social and environmental impacts, and the vast array of social and environmental outcomes that could effectively be pursued, MLA relies heavily on these government priorities to provide direction on which public goods the government is looking for MLA to pursue with its RD&E efforts.

When MLA selects RD&E projects that are jointly funded by industry levies and government matching dollars the project must deliver a balance of industry (private) and public benefits. However, there is an opportunity for RDCs to conduct rural RD&E with a greater emphasis on public benefits. A recent example of this is a DAFF initiative called Australia’s Farming Future - Climate Change Research Program and DAFF awarded MLA a grant to coordinate a national collaborative research program to understand whether, and to what degree, strategies can be found to reduce livestock greenhouse gas emissions while at the same time increasing or maintaining productivity. The MLA coordinated project receives 73 per cent of its funding from DAFF, 22 per cent of its funding from MLA and the remaining 5 per cent from other project partners. These funding allocations reflect the fact that the project benefits are heavily weighted towards public benefits, rather than industry benefits. DAFF’s selection of MLA acknowledges MLA’s ability to deliver RD&E outcomes for government policy priorities. The Australia’s Farming Future – Climate Change Research Program demonstrates the potential for RDCs to deliver RD&E outcomes with a higher public good weighting provided government funding levels are also higher relative to industry investment.

### **3.2 Measuring the impact of RDCs on public goods**

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In 2009 MLA, with encouragement from DAFF managers, undertook a study to develop a methodology to estimate RDCs’ contribution to the environmental sustainability of their respective industries. This study did not try to quantify the environmental impact (the challenges of this have already been covered); instead the study looked at MLA’s contribution to the adoption of natural resource management practices. The majority of

MLA's RD&E programs involve collaborating with other research organisations, therefore, the development of this methodology involved estimating the attribution of producer adoption to the various research organisations involved. While this is extremely challenging, it is attempted in order to estimate the value that MLA contributes.

The study looked at seven management practices (see Box 3.2 for an explanation). The results (see Figure 3.4) showed that adoption rates increased over time and generally MLA made a significant contribution to adoption, with the most significant contribution (on a percentage basis) being for the adoption of contour banks and perennial pastures.

### **Box 3.2: Definition of management practices**

**Contour banks:** Earthen structures placed across and at intervals down a slope so as to intercept and divert run-off.

**Permanent pastures:** This is not a management practice that is part of the MLA mapping framework, however, it is used as a proxy for perennial pastures.

**Perennial pastures:** Deep-rooted pastures designed to provide groundcover throughout the year, but should be combined with appropriate grazing to ensure complete groundcover.

**Soil testing:** Testing soil for its nutrient status and pH level.

**Drainage cover:** Maintaining groundcover along drainage lines to prevent run-off with a high sediment load and nutrient load from entering watercourses.

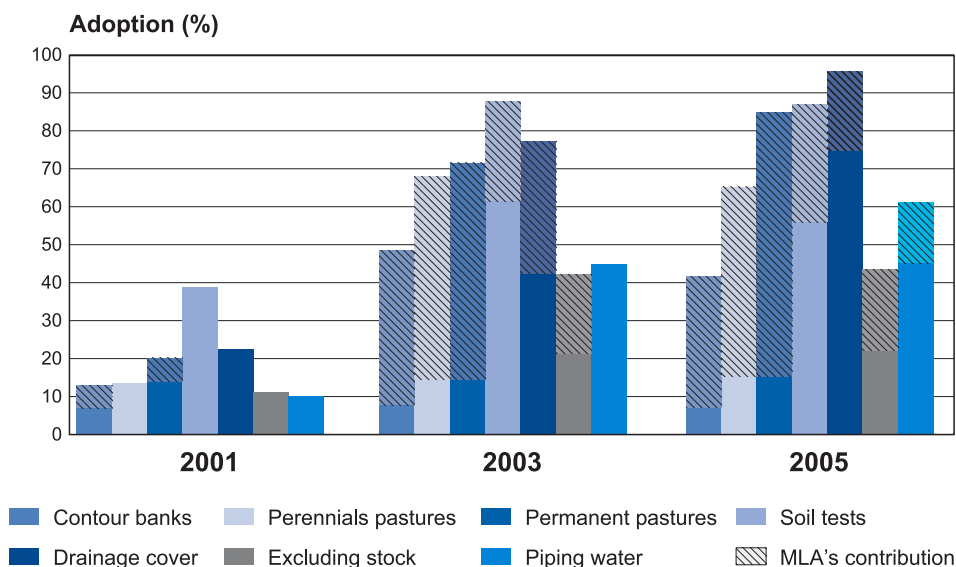
**Exclusion of stock:** Selectively restricting and regulating stock access to waterways and riparian land to minimise the negative effects of stock on stream-bank integrity, riparian vegetation and water quality.

**Piping stock water supplies:** The installation of a piped and reticulated stock watering system.

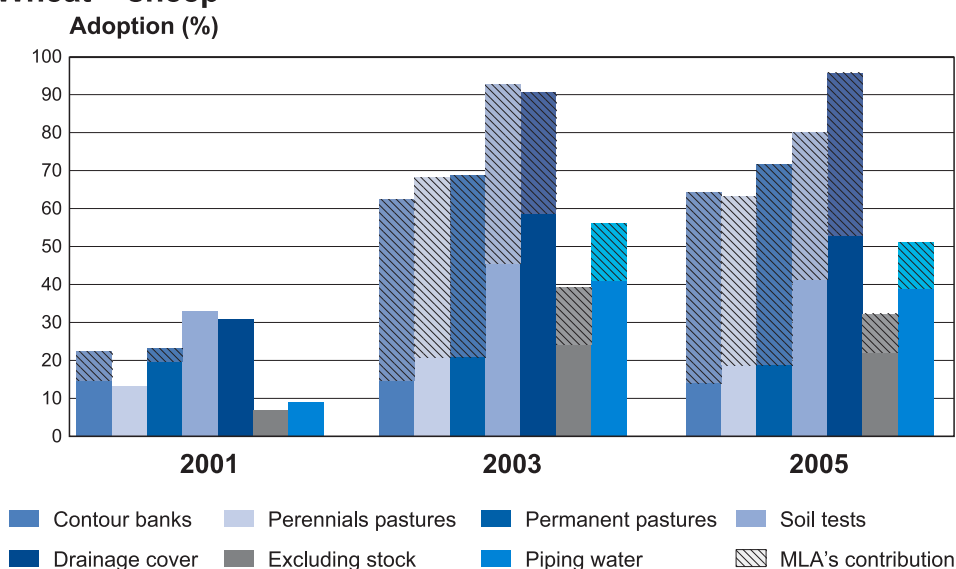


**Figure 3.4: Adoption of NRM practices and MLA's contribution to the environmental sustainability of the red meat industry**

### HRZ



### Wheat – sheep

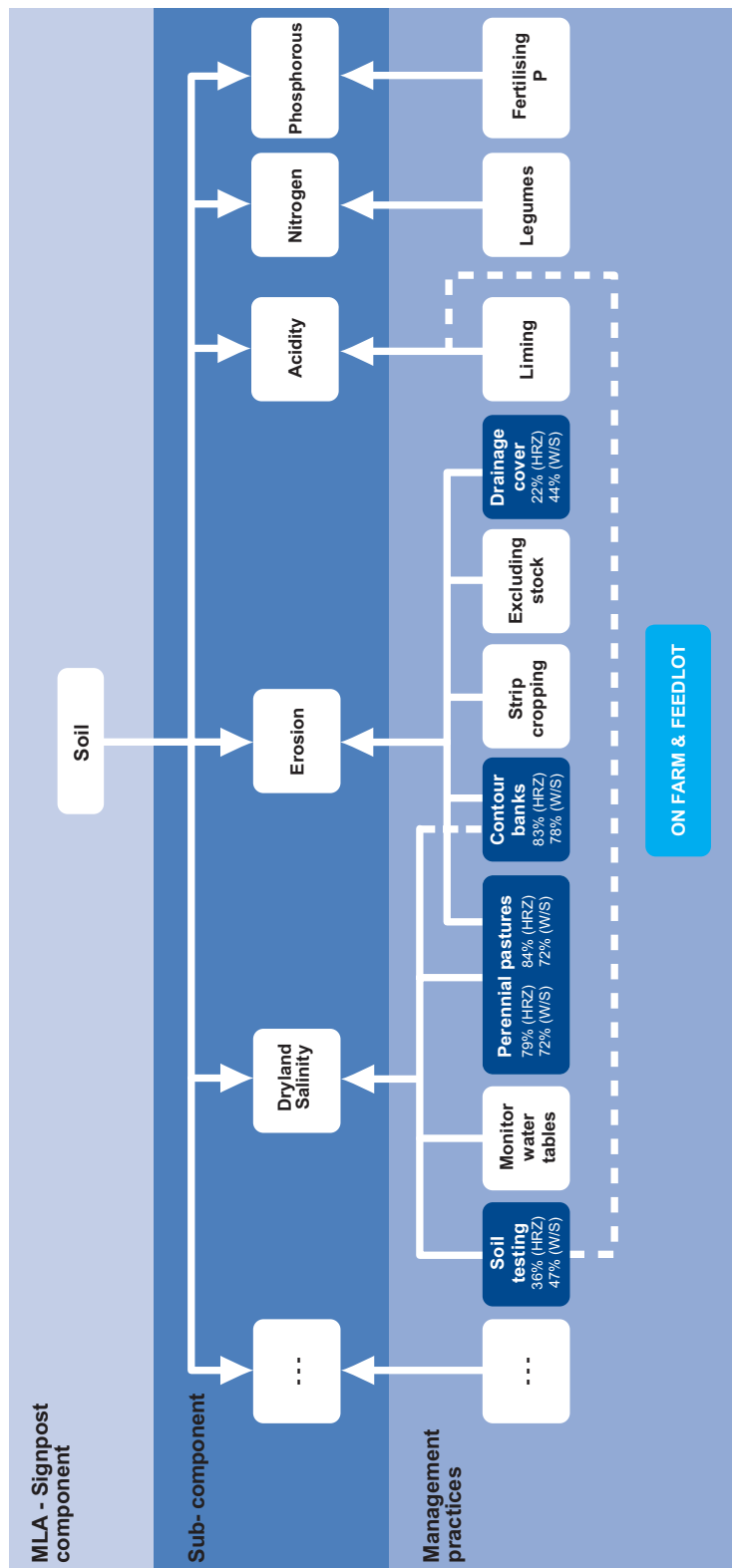


Note: Contribution calculated under the Farmers' ToT baseline scenario.

Data source: ABARE 2008, 'Farmers' Terms of Trade Index', *Australian Commodity Statistics*, table 17, p. 17; ABARE 2000, *1998-99 Natural Resource Management Survey*; ABARE 2001, *Sustainable Grazing Systems (SGS) Survey*; Solutions Marketing and Research 2003, *Producer R&D Awareness and Adoption*; Axiom Research 2005, *LPI Awareness and Adoption*; CIE calculations.

In the study a mapping framework was developed using the Signposts for Agriculture Framework to demonstrate the linkage between the uptakes of management practices on farm to environmental sub-components and then to four MLA-Signpost components, namely, soil, water, biodiversity and atmosphere. Figure 3.5 shows the mapping framework for the soil Signpost and depicts how the changes in soil testing, perennial pastures, contour banks and drainage cover affect soil through their impact on dryland salinity and erosion.

**Figure 3.5: MLA's contribution to environmental sustainability – soil component (2005)**



Note: The dashed line is used to indicate that the adoption data does not correspond with this environmental condition, despite the linkages recognised in this framework. Also, the processing sector has been removed from this diagram due to space constraints — it can be seen in the original mapping framework in appendix A.

Data source: ABARE 2008, 'Farmers' Terms of Trade Index', *Australian Commodity Statistics*, table 17, p. 17; ABARE 2000, *1998-99 Natural Resource Management Survey*; Axiom Research 2005, *LPI Awareness and Adoption*; CIE calculations.

### 3.3 Determining the right balance between public and private funding

#### 3.3.1 Funding and benefits are balanced at the portfolio level, not the program level

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MLA strives for balance across its RD&E portfolio. Project selection takes into account private and public outcomes, the risk profile of the project and where the project fits within the RD&E continuum (see Box 3.3 and Figure 3.6). Generally there is a time lapse of +5 years between idea generation and completed R&D. Then a further 3–5 years following completion of R&D contracts before a critical mass of industry uptake has occurred and industry impact can be meaningfully quantified and commercially validated. Balancing the portfolio across the RD&E continuum enables MLA to concurrently drive adoption of proven R&D outcomes while investing in future economic, environmental and social solutions.

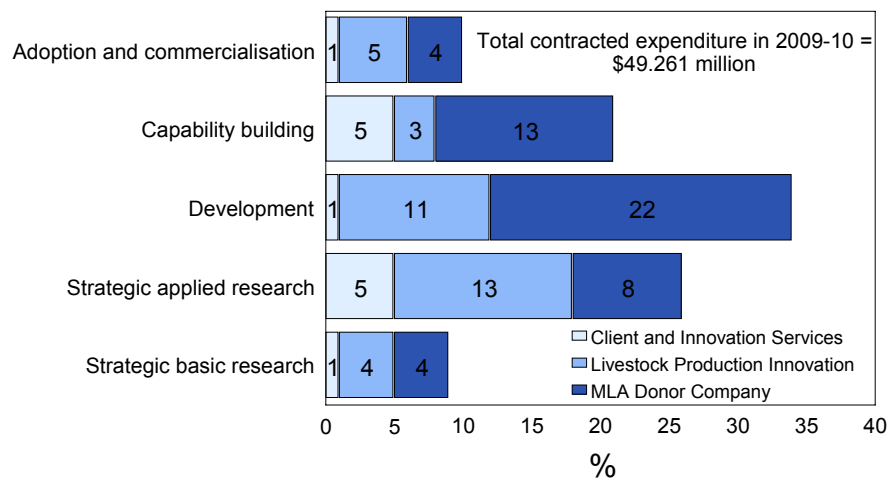
#### **Box 3.3: Categorisation of MLA R&D based on ABS reporting system**

##### **Definitions based on outputs:**

- Strategic basic research – provides a broad base of knowledge necessary for the future solution of recognised practical problems.
- Output: new research knowledge platforms or research tools, enabling technologies
- Strategic applied research – to determine new ways of achieving some specific and predetermined objectives – identifies a possible solution.
- Output: ‘proof-of-concept’ on limited scale.
- Development – aims to produce new materials, products, devices, policies, behaviours or outlooks, or allow installing of new processes, systems or services, or modifications to existing new processes, systems or services.
- Output: new ‘market-ready’ products or services (or modifications to existing products or services), including pre-commercial development and validation (i.e. deliverables)
- Adoption and commercialisation – activities to facilitate adoption and/or commercialisation of specific products or services.
- Output: adoption and commercialisation related activities relating to the market take-up of specific products and services, IP protection, practice change or business improvement (financial, environmental, social).
- Capability building – semi-formal and formal education.
- Output: innovation capability, professional development, vocational training, etc – not product specific.

**Figure 3.6**

**MLA R&D contracted expenditure in 2009-10 by ABS reporting categories**



In 2009-10 only 9 per cent of MLA’s RD&E budget is allocated to strategic basic research. Even though the majority of funding is allocated to projects that could be classified as *industry-specific* or *adaptive*, significant benefits are generated beyond those captured by levy payers. While greater knowledge spillovers may flow from basic and basic-strategic R&D, ie the beginning of the RD&E continuum – it is at the other end of the continuum that the majority of social and environmental spillovers are generated. This is because the majority of social and environmental benefits are not generated until the new innovation is adopted at the appropriate point along the supply chain.

MLA also manages risk across its RD&E portfolio. While MLA does not invest in projects *expected* to generate very modest returns, MLA appropriately allocates funding to some projects where there is a risk of modest returns (for example the development of an environmental certification scheme for producers). In fact there is greater need to invest public and compulsory levies in these riskier projects because there is little likelihood of private investment. To illustrate, strategic basic research is sometimes pursued to identify a new idea to solve a problem that has not been satisfactorily resolved by more applied research.

## 4 Governance arrangements

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For RDCs to operate efficiently and effectively they must be responsive to the reasonable expectations of all stakeholders. In their Issues Paper the Productivity Commission has identified a number of governance-related concerns as follows:

- A perceived failure by the Government to effectively and consistently communicate priorities and requirements to RDCs and to follow these through when overseeing strategic and operational plans
- A weakening of government input and direction into the activities of the statutory corporations following the removal of a government nominee on each of their boards arising from the Uhrig Review (Commonwealth of Australia 2003)
- Differences in the stringency of governance requirements between the statutory corporations and the Industry Operated Companies (IOCs)
- Deficiencies in requirements for consultation with industry stakeholders, particularly given changes over time in the degree to which nominated peak bodies are representative of levy payers
- Difficulties posed for effective governance of the IOCs by the blurring of the boundaries between their R&D-related responsibilities (and associated funding), and their broader marketing, promotion, education and, in some cases, policy representative roles
- Perceived shortcomings in project evaluation protocols and approaches

This Chapter of the submission addresses these concerns by providing a detailed description of MLA's governance arrangements. In addition, further details are provided in relation to the structures and systems that underpin MLA's management of: administrative efficiency; effective evaluation; levy arrangements; and management of intellectual property.

### 4.1 MLA's governance arrangements

#### 4.1.1 MLA's evolving governance structure

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MLA's governance structure is regularly reviewed and updated to ensure it remains effective and relevant. In describing MLA's governance systems, it is necessary to take into account the following arrangements and documents specific to MLA's operating environment, together with the broader legal frameworks under which it operates. These include:

- Statutory Funding Agreement (SFA) between MLA and the Commonwealth Government
- *Australian Meat and Live-stock Industry Act 1997*
- MLA Constitution
- Statutory obligations under the *Corporations Act 2001* and related legislation
- ASX Corporate Governance Council's Corporate Governance Principles and Recommendations (2nd edition)
- MLA Code of business conduct and ethics
- Expectations of MLA members

- Meat & livestock industry memorandum of understanding (MoU)

The Australian Government (via DAFF) is able to monitor and influence MLA's governance arrangements through a range of mechanisms, but particularly through the SFA. If DAFF considered that MLA was in breach of its obligations under the SFA, it has the right to suspend or terminate payments, reduce the amount of payments or terminate the SFA if MLA has not rectified a breach within 28 days of receiving a notice from DAFF.

In addition, in accordance with the requirements of the SFA, MLA is required to conduct regular performance reviews. The terms of reference for these reviews focus on an assessment of MLA's performance against its Strategic and Annual Operating Plans, taking into account:

- Performance of MLA in meeting its obligations under the SFA
- MLA's development of its strategic, operating, risk management, fraud control and intellectual property plans
- Delivery of benefits to the industry foreshadowed by MLA's strategic and operating plans

The inaugural review into MLA's performance has just been completed and concluded that:

- A structured approach had been followed by MLA in the development of its Strategic and Annual Operating Plans and that these plans align with government research and development priorities and the industry priorities established in the Meat Industry Strategic Plan (MISP).
- MLA has the support of its Peak Councils and key stakeholders, and is viewed as a valuable contributor to the red meat industry. MLA directors and staff are perceived highly by stakeholders as skilled professionals working for the benefit of industry.
- The MLA Board is open and transparent. The Board has policies and procedures to guide its operations and has been committed to improving governance at all levels.
- MLA has been diligent and meticulous in meeting the requirements of the company's Statutory Funding Agreement with the Commonwealth.
- MLA has developed and implemented a comprehensive approach to assessing value for money from past investments.

In addition to MLA's performance review requirements and formal reporting to DAFF as specified in the SFA, DAFF can also influence MLA's activities and governance procedures through a range of informal mechanisms. MLA proactively seeks input from DAFF through regular meetings to discuss its Strategic and Annual Operating Plans and through the more formal mechanism of the annual R&D forum.

MLA considers that the current level of DAFF involvement in imposing, monitoring and enforcing governance requirements is appropriate.

#### 4.1.2 Impact of the national and rural research priorities on MLA programs

MLA deliberately ensures strong alignment with national and rural research priorities as evidenced by the following table.

**Table 4.1: Alignment of MLA programs with Government priorities**

National Research Priorities	Rural Research Priorities	MLA RD&E Programs
Promoting and maintaining good health	Productivity and adding value	<p><b>1.2</b> Maintaining and liberalising access to world markets</p> <p><b>1.3</b> Maximising market options for producers and exporters in the livestock export trade</p> <p><b>2.1</b> Improving eating quality</p> <p><b>2.2</b> Enhancing the nutritional value of red meat</p> <p><b>2.3</b> Developing new products</p> <p><b>3.1</b> Increasing cost efficiency and productivity – on farm</p> <p><b>3.2</b> Increasing cost efficiency and productivity – off farm</p> <p><b>3.3</b> Improving industry and market information</p>
An environmentally sustainable Australia	Natural resource management Climate variability and climate change	<b>3.4</b> Ensuring sustainability
Safeguarding Australia	Biosecurity	<p><b>1.1</b> Enhancing product integrity</p> <p><b>3.6</b> Improving biosecurity, animal health and welfare</p>
Frontier technologies for building and transforming Australian industries	Innovation skills Technology	<p><b>3.1</b> Increasing cost efficiency and productivity – on farm</p> <p><b>3.2</b> Increasing cost efficiency and productivity – off farm</p> <p><b>3.5</b> Science for the future</p> <p><b>4.1</b> Increasing adoption of R&amp;D outcomes</p> <p><b>4.2</b> Building world-class skills and innovation capability</p>

Source: MLA 2009-10 Annual Operating Plan

In February 2010, Minister Burke wrote to RDCs indicating the following priorities which have been incorporated into MLA's new 2010-15 Strategic Plan and 2010-11 Annual Operating Plan:

- Productivity improvement
- Climate change
- Sustainable environmental resource management
- Maintaining and improving international market access
- Value chain effectiveness and efficiency
- Biosecurity
- Workforce skills and education
- Diversity
- Collaboration
- Evaluation

As indicated previously in this submission, there are very strong and positive synergies between industry research needs and government policy objectives and MLA strategic research plans encompass both sets of priorities. Combining government and industry priorities provides an optimum balance between applied research delivering more immediate industry benefits and longer-term strategic goals which not only reflect government and community concerns but are also likely to better position the industry to address long-term future challenges. As has been noted, MLA considers that the close linkage of these public and private areas of focus should be maintained as it provides the most efficient and effective mechanism to deliver government policy objectives.

#### ***4.1.3 Government feedback on strategic and annual plans***

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MLA undertakes extensive development, consultation and review processes with a wide range of stakeholders prior to finalising its Strategic Plan and Annual Operating Plans. MLA is satisfied that the current arrangements provide a good level of government input and oversight. The MLA Annual Operating Plans (AOP) submitted to the Australian Government sets out the detailed operating information to support the strategies and objectives in the Strategic Plan. These annual plans are developed following significant consultation with the meat and livestock industry generally and the organisations which MLA services and interacts with (including Peak Councils, the Australian Meat Processor Corporation and LiveCorp). If the Minister requires increased input into the planning process, it is considered that this input would best be provided into establishing longer-term issues and quantifiable goals covered within the Strategic Plan, rather than annual plans. However, MLA is always willing to discuss and respond to any input which the Department or the Minister's office may provide.

#### ***4.1.4 The MLA Board's commitment to effective operation***

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The MLA Board is committed to ensuring that it operates effectively. To ensure its efficiency and effectiveness, the Board:

- Has a strong focus on strategy setting.



- Evaluates its performance on a regular basis, with a formal performance review undertaken annually. This review is facilitated by a Board review specialist and focuses on the effectiveness of the Board as a whole and the performance of individual directors. Observations from the review are reported to, and discussed by the Board.
- Resolved to reduce the number of directors by one, effective from the 2009 annual general meeting.
- Ensures that there is a clear definition of its roles and responsibilities. The roles and responsibilities of the Board are formalised in the MLA Board Charter and each Board committee also has a committee charter which is regularly reviewed.
- Sets an annual agenda framework for its meetings which sets out important items to be considered and reviewed throughout the year.
- Participates in general strategic discussions at each of its Board meetings, as well as participating in strategic planning sessions with management.
- Undertakes regular training facilitated by a Board training specialist.

#### ***4.1.5 Selection process for new appointments to the MLA Board***

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MLA's Constitution establishes a Selection Committee for the purpose of reporting to the members of the company on the suitability of candidates for re-election or election to the office of director at general meetings. The Selection Committee is comprised of: three individuals elected by MLA producer members at the AGM; three appointed by Peak Councils (CCA, SCA, ALFA); and three MLA directors (one of whom is to be the MLA Chair when the chair is not seeking re-election).

The Selection Committee undertakes a comprehensive selection process in order to identify the best candidates for election at the MLA AGM and is supported by an external board recruitment specialist. In order to commence the recruitment process each year, the Selection Committee meets to discuss the current skills of the directors who will be retiring at the upcoming AGM. The Selection Committee then extensively reviews the skills of all directors, and the balance of those skills, in light of the retiring directors and any changing circumstances which need to be accommodated. To assist the Committee a skills matrix is analysed which identifies the skills of each director and highlights any gaps which may result from the retirement of the directors. The matrix is reviewed annually by the MLA Board to ensure it is appropriately balanced to address the needs of the industry.

The ASX Corporate Governance Principles and Recommendations 2<sup>nd</sup> ed (2007) recommend that a Board should establish a nomination committee (recommendation 2.4). MLA's current Selection Committee process is in keeping with the Principles and is widely supported throughout the industry. Over the years, AGM resolutions put forward by a small group of members to provide for direct election of directors have not been successful. The recently completed performance review of MLA did not identify any significant issues with the current selection process for directors to the MLA Board.

#### ***4.1.6 Managing conflict of interest***

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MLA considers that the legislative framework for dealing with a director's conflict of interest, together with its internal policies, adequately addresses any conflict issues which may arise.

Conflicts of interest arise on most boards, but especially so in not-for-profit boards where the skills and industry expertise of directors, which the company seeks and

benefits from, may also lead to conflicts of interest. The MLA Selection Committee considers any potential, actual or perceived conflicts of interest when reviewing candidate applications for director positions as well as during the interview and nomination process. Importantly, the Committee considers whether the conflict can be managed within existing frameworks or whether the conflict is of a nature which would prevent the candidate effectively carrying out their duties.

The MLA Board takes an open and transparent approach to conflicts of interest and has fostered a culture of disclosure. While the *Corporations Act 2001* provides a framework for the disclosure and management of directors' business and other interests, MLA has implemented a number of additional internal protocols to effectively deal with conflicts.

MLA does not consider that the relationships and roles of the various service organisations and peak bodies in the meat and livestock industry give rise to conflict of interest concerns. Contractual and legislative frameworks effectively define the roles of these organisations, while the Industry MoU further articulates the relationships and interactions between these organisations. The SFA prohibits MLA from engaging in 'agri-political activities', providing a further governance framework for MLA to ensure that it does not transgress into areas which are more properly within the scope of other organisations.

#### ***4.1.7 Meeting the core requirements of the PIERD Act through the Statutory Funding Agreements***

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MLA's SFA is an important document which has significantly influenced MLA's governance structure and policies. The SFA ensures that the roles and responsibilities of each party are clearly documented, while the reporting obligations provide the basis for MLA's planning and strategy structures.

MLA understands that its current SFA is based on a template developed by DAFF. However, each IOC has its own requirements which need to be addressed and negotiated on an individual basis, reflecting the differences in industry representation, size and structure. Provided that the general reporting and compliance regimes are broadly similar for each IOC, we do not see a benefit in further standardising SFAs.

#### ***4.1.8 Managing contributions from government and levy payers***

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As an industry levy-funded organisation, MLA has implemented a range of detailed governance procedures to ensure that expenditure against individual levy streams is clearly accounted for and transparently reported. Similarly, the receipt of government matching R&D funds is also managed precisely with internal systems to ensure that eligibility criteria are established and reviewed and that delegations are in place to clearly separate the expenditure of marketing and R&D funds.

#### ***4.1.9 Industry consultation protocols***

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The Industry MoU sets out the roles, responsibilities and relationships of the service companies, peak bodies and the Commonwealth and this has enabled the establishment of a compliant and effective industry consultation process. Key stakeholders are routinely consulted and provided with an opportunity to contribute to MLA strategy and programs.

MLA places considerable focus on interacting with industry organisations, including the peak council members of the company. This effort is both formal and informal and

spans the business from the Chair, Directors and Managing Director to General Managers and senior program staff across the company.

Formal and structured interactions include:

- Joint board meetings
- Attendance at board meetings of peak councils, industry companies (LiveCorp, AMPC) and state farm organisations
- Invitations for peak councils and other industry stakeholders to attend MLA Board meetings
- Structured planning forums including the domestic and international marketing taskforces and R&D committees (overall and sector specific)
- Program and project planning and implementation committees and panels

Less structured interactions include MLA attendance at industry forums, open days and meetings to present MLA's key initiatives and to hold discussions with industry representatives and levy payers. In 2008/09 Board members attended an estimated 145 industry events. The MLA Chair, directors and Executive Team have regular informal interactions with industry stakeholders and individual levy payers at these industry events.

In 2007, MLA conducted a survey of its major stakeholders. The survey found that 93 per cent of stakeholders were quite satisfied or very satisfied with communication and contact with MLA. The survey identified the following priorities for improving consultation and liaison with industry:

- MLA should take a more consultative, top-down approach with stakeholders and focus more on strategic planning rather than everyday details.
- MLA to work more closely with local peak industry bodies when co-ordinating events or programs in a region.
- Consultation should be done in a more timely manner (eg earlier on in the project / program planning process).

The majority of industry stakeholders consulted noted a positive shift in MLA's culture to be more open in their interactions with industry. As evidenced by the recent Performance Review (2010) MLA's board and executive team are perceived as open and accessible, and generally responsive to industry concerns and issues.

## **4.2 Increasing administrative efficiency**

### ***4.2.1 Benefits and costs of combining R&D and other industry services in one organisation***

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MLA was formed through the amalgamation of AMLC and MRC in 1998 following the recommendations of the Meat and Livestock Industry Reform Steering Committee and Task Force established by the Minister in May 1996. The committee identified a number of benefits that could be achieved by combining marketing and R&D into a single service provider and it is considered that these still apply today:

- Simplified and less complex
- Eliminates demarcation and duplication problems
- Allows for combined consultation, communication and accountability

- Facilitates some managerial economies and spread of overheads
- Ensures communication between R&D and marketing professionals
- Ensures coordination of information services and commercialisation of research
- Allows board to undertake a fuller role
- Enables joint species R&D and marketing projects to be managed efficiently
- R&D decisions made in a market context and visa versa, but the levies kept separate

The integration of marketing and R&D within the one organisation has proven very beneficial for the red meat industry as it has reinforced the importance of customer-driven innovation and has better facilitated innovation through the supply chain. MLA's overseas offices, which are located in all major red meat markets, have proven invaluable in transferring clear customer and market signals back to MLA's innovation/R&D business units. These customer requirements are built into the industry's innovation and R&D programs as appropriate (examples include food safety, traceability, eating quality and new product development). The integration of R&D and marketing ensures that R&D works in concert with production, processing and marketing initiatives and creates greater efficiencies and increased adoption of R&D outcomes.

Combining R&D and marketing into one organisation also delivered economies of scale, especially in corporate services delivery. The number of Corporate Services employees reduced from the combined AMLC/MRC pre merger figure of 37 to 18 post merger. There was also a reduction in Board costs and MLA is able to exercise greater purchasing power compared to the previous organisations. There has also been rationalisation in investment in IT systems and the delivery of online services (website etc).

#### ***4.2.2 MLA manages the matching of government dollars for the red meat and livestock industry***

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Since the formation of MLA, statutory levies have also been established for the live export and processing sectors (managed through LiveCorp and AMPC, respectively) with MLA receiving the government matching dollar for all three organisations. This approach enables the individual parts of the industry to manage the investment of their R&D dollars independently, while enabling a coordinated approach to RD&E across the industry.

LiveCorp and AMPC have obtained efficiencies through reduced overhead and administrative costs by recognising MLA as the key R&D and marketing service provider. This structure encourages a coordinated supply chain approach which has delivered some of the industry's most impressive innovations, while minimising duplication.

#### ***4.2.3 Governance systems to manage costs, including executive salaries, Board costs etc***

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As evidenced by the recent MLA Performance Review and described elsewhere in this submission, MLA has a very strong governance framework in place. This, coupled with a skills based Board that is accountable to members and stakeholders, transparent processes and a strong monitoring role by industry representative bodies ensures best

practice is adopted to prevent any unjustifiable escalation of costs. A key part of the Board role is to ensure MLA delivers its services efficiently and effectively.

Some of the specific processes, initiatives and outcomes are as follows:

- MLA seeks a productivity gain from within MLA each year to offset inflation
- MLA has an effective tender process for contracted services
- All central services, eg telecommunication, stationery, travel, audit, legal, insurances etc, are placed out to tender on a regular basis
- MLA commits to its stakeholders to hold Corporate Services costs to 6 per cent of revenue
- Salaries are benchmarked using data from Mercers, Hewitts and the Government Remuneration Tribunal
- MLA has a policy of structuring its salary levels at the median
- Total salaries have remained at the same level for the past three years as productivity gains have offset salary increases
- Total remuneration paid to the Managing Director has increased at less than 1 per cent compound over the past eight years
- Directors fees are capped by members and changes to the cap have to be approved at an AGM
- Directors' fees have increased once (4 per cent in 2004) in the past eight years
- Since February 2006 there has been a freeze on MLA's head count numbers
- Senior Managers and Managing Director salaries have been frozen since July 2008 in light of the Global Financial Crisis

### **4.3 More robust ex-post project evaluation**

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MLA is committed to subjecting all of its programs to an evaluation framework that is credible, rigorous, comparable (across programs, time, etc) and that is resource efficient. Over the past five years significant effort has been devoted by MLA to improving its program evaluation framework. The framework now used by MLA is compatible with the evaluation framework developed by the Department of Finance and Administration and with the Guidelines on Evaluation Practice developed by the Council of Rural Research and Development Corporations (CRRDC).

As a result of the work undertaken by MLA on program evaluation, the recent independent review of MLA performance by Arche Consulting concluded that:

- “MLA has developed a robust approach to evaluation, and has comprehensive processes in place to assess performance and the delivery of benefits to industry and levy payers.”
- “The Review Team finds with confidence that MLA has delivered value to the industry and levy payers since its inception.”

#### **4.3.1 Key aspects of the MLA evaluation framework**

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Program evaluation at MLA is conducted at two primary levels: KPI performance measurement and program impact measurement.

### *KPI Performance Measurement*

The first level of program evaluation at MLA involves setting and reporting against a comprehensive set of Key Performance Indicators (KPIs) across MLA programs which are time-based. These KPIs fall into two categories as follows:

- Output KPIs refer to direct innovation products arising from a R&D program. Examples could include a new variety of pasture produced, a document on a new management system, a new robotic technology, or an environmental best practice manual. Output KPIs basically reflect the extent to which program and project milestones have been met.
- Outcome KPIs are observable and measurable changes in practice and behaviour that result from the program investment. Outcome KPIs measure adoption as well as the resultant benefit when the program output is adopted. Examples of outcome KPIs might include the number of producers adopting a new pasture management system, the number of processors implementing environmental best practice systems, or the number of consumers that purchase a new product. Validation of the industry benefits realised as a result of the adoption is also important and includes measures such as improved yield; better eating quality; reduced occupational health and safety issues; or improved animal health. The difference between an output KPI and an outcome KPI can reflect the extent to which expected results are actually achieved in real life, rather than in purely experimental situations.

MLA performance against output and outcome KPIs is referenced each year in MLA's Annual Report. Additionally, each year MLA publishes a detailed report of performance against the MLA Annual Operating Plan. Supporting information is also provided on activities completed against key initiatives set for the program. Finally, the report contains information on performance against planned budgets.

### *MLA Program Impact Measurement*

KPIs are used as a tool by management and stakeholders on a regular basis to ensure that MLA programs are meeting objectives set. In addition to undertaking regular assessments that programs are on track, it is also important to periodically evaluate the extent to which MLA programs are delivering economic, environmental and social benefits to the Australian meat and livestock industry and to the wider community. This impact assessment of MLA's programs represents the second level in MLA's program evaluation framework.

Since 2005 MLA has established a standardised approach for assessing the triple bottom line (TBL) impact of its programs and has dedicated resources to establish, implement and manage the process. Independent advisors were appointed to develop a systematic evaluation framework, and assist MLA in implementation. A rolling program of evaluations using the established framework has been in place since 2007.

This second level MLA evaluation process involves defining program impact on five dimensions of outcome: demand, supply, risk, environment and social. Defining impacts across these five dimensions reduces all outcomes to a common set of measurements, enabling comparability across programs with differently defined outcomes.

Changes in demand or supply are fed into an economic impact assessment module which includes a multi-country, multi-commodity model of world meat markets. Information generated by this module includes the change in:

- Industry profits (changes in value added) at each point along the value chain

- Red meat consumer welfare
- Net change in value added in the rest of the economy

Changes in risk, or environmental and social outcomes often have economic impacts as they can result in a shift in demand (for example health perceptions of red meat), supply (for example a reduction in water use per kilogram of turn-off), or in transport and trade margins (for example, lower fuel consumption for transport, or premiums on 'green' product). These are taken into account in the economic module. But there are often other impacts or benefits from these outcomes that need to be measured in a TBL evaluation. Where there are well accepted 'values' placed on these outcomes the dollar value is included in an assessment of the net benefits of a project/program/strategic theme. However, there are many risk mitigation, environmental and social outcomes that do not have a clear value that can be expressed in dollars. The MLA evaluation methodology measures these in terms of achievement against target outcomes.

### ***4.3.2 Challenges in Program Evaluation***

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In terms of questions raised in the Productivity Commission's Issues Paper a number of challenges and procedural aspects of MLA's evaluation process need to be highlighted.

#### *All MLA programs evaluated*

MLA plans to evaluate all of its programs, not just a random or non-random subset and the first round of this comprehensive approach will be completed within the next financial year. As a result, the potential problems associated with project sampling processes, such as those raised by the Productivity Commission's Issues Paper, are avoided within MLA's evaluation framework.

In evaluating all programs, MLA has found it useful to assess broad portfolios of activity, sometimes involving interrelated groups of programs, rather than a narrower focus on individual projects or sub-programs. This is because observable changes in practice and behaviour usually arise from a set of investments, rather than a single investment. This forces recognition of how projects work together to achieve outcomes and helps to reduce double counting, or more commonly, attributing the outcomes to the final investment in the program cycle. By clustering projects according to program area all program costs are accounted for in a Benefit Cost Analysis (BCA) regardless of success or failure at the project level. Generally the higher the degree of program aggregation, the lower will be the resulting benefit cost ratio (BCR).

As an example of this program aggregation, in evaluating the MLA value-add to the lamb industry, both production R&D and marketing campaigns were included in the one evaluation. This is because close integration between MLA demand and supply activities has been critical to the lamb industry's transformation. R&D, prompting an on-farm production shift away from light lambs towards large, lean lambs and development of a professional lamb production sector, produced product better attuned to consumer needs, but this product still needed to be marketed. Promotion of lean lamb would not have had an impact without supply developments that influenced product transformation, and supply transformation would not have produced a significant impact without demand developments.

#### *Attribution and the construction of counterfactuals*

As was noted in the previous section, a reason for aggregating program activities in the evaluation process is that observable changes in practice and behaviour usually arise

from a set of investments. It is also noted however, that rarely will these investments be made by MLA in isolation. Typically other government agencies will also be involved in bringing about the changes in practice and behaviour, and investment by private interests (input suppliers, producers, processors) will also be required. Assessing how much of the change in behaviour is due to the RDC activity undertaken by MLA, versus the contribution of related parties, requires fine judgement.

Also requiring fine judgement is the construction of 'counterfactuals'. As the Productivity Commission notes in the Issues Paper, it is important that the construction of these 'counterfactuals' be based on analysis and that consistency is achieved across different evaluations.

In order to address these attribution and counterfactual problems, the approach adopted by MLA involves the following:

- The evaluation process is established independently of MLA with an independent consultant commissioned to undertake the work.
- As part of the evaluation process, analysis is commissioned on the attribution and counterfactual issues to form a 'foundation of facts' on which to base further judgements.
- This analysis is considered by the independent consultant and is also subject to peer review internally within MLA. Peer review provides an opportunity for learning and sharing of experiences in addition to increasing the robustness and credibility of estimates.
- For some evaluations, once work has been completed by the independent consultant, the evaluation is further reviewed by a panel of independent experts, further adding credibility to the estimates.
- Finally, the results of the evaluation are discussed and agreed with Peak Council organisations in the meat and livestock industry.

Each stage in this process tends to dampen, rather than amplify, the contribution made by the MLA program to the observed change in practice and behaviour.

*Economic modelling takes into account "second round" impacts.*

The use by MLA in its evaluations of an economic model of world meat markets also serves to moderate the impact of MLA's programs and portray a more accurate measure. Not to use such a model would be to ignore second round impacts from MLA's programs. For example, a successful MLA marketing campaign in Japan, might increase demand for Australian beef in that country, but in meeting this demand product might have to be redistributed to Japan from the domestic and Korea markets. In evaluating the impact of the Japan marketing program, it is important to not only account for increased sales in Japan, but also reduced domestic and Korean sales. Similarly, an MLA R&D program might increase production, but, in the absence of other changes, this will reduce meat prices. Again it is important that both the impacts are taken into account. Failure to take into account these "second round" market responses is a common problem in program evaluations.

#### ***4.3.3 Results from MLA program evaluations***

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Results from MLA evaluations completed to date are shown in Table 4.2. Generally the BCRs shown in this table, in the range of 1.5 to 5, are lower than those reported in the past from other organisations. For instance, the Productivity Commission in 2007



reported a simple average of BCRs of 45:1 and a weighted average of BCRs at 21:1. The simple average is known to lead to an overestimate of the actual BCR for a pool of investments, so the weighted average BCR is thought to be a more representative aggregate measure. The weighted average BCR for the 2009 RDC aggregate was estimated to be 6:1. Meat & Wool New Zealand (the MLA equivalent in NZ) has reported a simple average of on-farm research-only BCRs of about 8:1. The lower BCRs achieved by MLA, in comparison with those reported elsewhere, can be attributed to the rigour and conservatism embodied in the MLA evaluation process.

**Table 4.2: Completed MLA evaluations**

Program	Investment period	Benefit period	Total PV of MLA investment	Commonwealth Funding (%)	BCR value (estimation methodology)
1.1 Enhancing product integrity (Predictive Microbiology)	1996-2006	1996-2026	\$4 million (2006)	50%	<b>11:1</b> (GE model)
1.2 Maintaining and liberalising access to world meat markets	1998-2006	1998-2020	\$50.5 million (2006)	5%	<b>8:1</b> (GE model)
2.1 Improving eating quality	1996-2005	1999-2029	\$223 million (2005)	40%*	<b>5:1</b> (GE model)
2.2 Enhancing the nutritional reputation of red meat	2001-2007	NA	\$43 million (2007)	7%	BCR could not be calculated
2.5 Aggressive promotion in the marketplace (lamb)	1991-2007	1990-2015	\$383 million (2007)	0%	<b>2.2-3.7:1</b> (GE model)
3.1 Increasing cost efficiency and productivity – on farm (lamb)	1991-2007	1990-2015	\$256 million (2007)	50%	<b>1.9-3.4:1</b> (GE model)
3.1 Increasing cost efficiency and productivity – on farm (beef)	2000-2007	2001-2015	\$93 million (2007)	50%	<b>3.4:1</b> (GE model)
3.3 Improving industry and market information	1998-2008	1998-2010	\$45 million (2008)	25%	<b>5.6:1</b>

\* estimate

#### 4.4 Improving the levy arrangements

The Productivity Commission's Issues Paper raised a number of points in relation to levies both in terms of administrative arrangements and some more general principles related to the link between levies and matching government dollars.

##### *Producer levies*

MLA is the recipient of compulsory transaction levies that are collected each time cattle, sheep and goats are sold. It is noted that MLA is not the only recipient of these levies as Animal Health Australia and the National Residue Survey also receive a portion of the funds. The component of the levy that MLA receives is devoted to R&D, marketing and

market access activities. The total transaction levies and the component of the levy that is devoted to R&D are listed below for each type of livestock. This R&D component of the levy is matched with government funds on a dollar-for-dollar basis.

- grassfed beef levy (total levy = \$5.00 per head; R&D component = 92 cents per head)
- grainfed beef levy (total levy = \$5.00 per head; R&D component = \$1.50 per head)
- mutton levy (total levy = 2% of sale price, maximum 20 cents per head; R&D component = 0.77% of sale price, maximum 7.7 cents per head)
- lamb levy (total levy = 2% of sale price, maximum \$1.50 per head; R&D component = 0.4933% of sale price, maximum 37 cents per head)
- goat levy (total levy = 37.7 cents per head; R&D component = 10.5 cents per head)

### *Processor levies*

Processor levies, paid to AMPC, are as follows:

- The amount that processors pay per head for cattle at slaughter is charged at \$0.006 per kilogram hot standard carcass weight. For a 270kg beef carcass this equates to \$1.62.
- Processors pay at slaughter 15 cents per head for sheep, 16 cents per head for lambs and 10 cents per head for goats.

In 2008-09 \$6.28 million (42%) of AMPC's levy expenditure was devoted to R&D activities managed through MLA and attracting an additional \$6.28 million from the federal government. The remainder of AMPC's expenditure in 2008-09 was devoted to marketing, industry support and administration.

### *Live exporter levies*

Live exporter levies, paid to LiveCorp, are based on the number of head loaded onto an export vessel:

- cattle: 0.9523 cents per kilogram (approximately \$3.00 per head based on an average export weight of 315 kilograms)
- sheep: 60 cents per head
- goats: 50 cents per head

The R&D component of these live exporter levies are as follows:

- cattle: 50 cents per head
- sheep and goats: 10 cents per head

### *Gross value of production (GVP) of the red meat and livestock industry*

The Australian government matches RDC expenditure on R&D on a dollar-for-dollar basis for eligible R&D activities, up to 0.5 per cent of industry gross value of production (GVP). A three year rolling average is used to determine the value of industry output. In 2008-09 0.5 per cent of the Australian red meat and livestock industry's GVP equated to \$52,766,141. In 2008-09 the industry received \$31.4 million of government matching funds, just below 60% of the GVP cap.

#### *4.4.1 Compulsory versus voluntary levies – MLA Donor Company*

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MLA is the recipient of both compulsory levies (as discussed above) and voluntary contributions. The compulsory levies in the red meat and livestock industry prevent industry participants from free-riding and encourage a higher level of industry investment in R&D compared to a voluntary levy system. Producers are more likely to support a level of funding closer to the optimal level of funding for the industry with a compulsory levy. In contrast, with a voluntary levy each individual producer would only be likely to support an optimal level of funding for their own enterprise. MLA argues that this is likely to be set lower than a compulsory levy because of issues including free-rider, scale and all the other arguments which support collective action discussed in Chapter 2 of this submission.

However, while a compulsory levy is considered the best way of addressing free rider and underinvestment issues, voluntary contributions also have an important role to play. MLA receives voluntary contributions from a broad range of innovation partners (many of whom are also compulsory levy payers) and these are handled through the MLA Donor Company (MDC).

MLA considers that the MLA Donor Company forms a critical component of our overall research strategy and that the capacity to attract voluntary contributions provides an important complementary balance to compulsory levies. MLA believes the MLA Donor Company mechanism for facilitating voluntary contributions presents an innovative and valuable model within the RDC framework which complements the more traditional compulsory levy arrangements as follows:

##### *Increased R&D Investment*

- Enables R&D investment by companies and collaborating groups along the supply chain in areas where normal primary producer levies are not available or are not appropriate for such investment.
- Facilitates access to important strategic opportunities to bring in research investment from outside the red meat sector.
- Provides a mechanism to support the development of SME ‘start-up’ companies to add to the spread of innovation relating to the red meat sector.

See the following case study in Box 4.1 for a specific example of how the support of the MDC mechanism has stimulated substantial investment in a key area for the processing sector.

#### **Box 4.1: Robotics case study**

Robotics has been identified as a 21<sup>st</sup> century industry transformational platform and the MDC model has facilitated significant investment in this important area of technology innovation. The R&D in this area is very new to the industry and due to its high risk nature, high cost, and long timeframes, it is unlikely that even the largest industry participants would be willing to explore it on their own.

Similarly, the market potential isn't big enough to be commercially attractive for a technology company to invest in without some form of inducement and due to very different production and labour conditions overseas there has, as yet, been very few developments in automation undertaken (with the exception of the Scandinavian pork industry). Given the high priority on ensuring the Australian industry at least maintains relative competitive advantage coupled with significant challenges associated with labour shortages and the need to improve OHS in the industry, it was not considered appropriate to wait for overseas developments to commence in this area. It is noted however, that the Australian industry has formed collaborative partnerships in the automation area with NZ-based companies where similar challenges are faced.

The robotics program has a holistic oversight stretching from the engineering fundamentals, the mechanical application and the commercialisation of such innovations.

MLA was only able to pursue these developments because of the MDC vehicle, as industry levies alone would not have been sufficient to support the advancements in this area.

#### *Strategic Development*

- A flexible approach to innovation strategy development. Collaborative research agreements with individual enterprises leading to longer term innovation investment and better R&D management.
- Development of new research collaboration opportunities and particularly the engagement of new research providers both within Australia and internationally (see Section 5.7.5).

#### *Building industry capability and skills*

- Programs to attract young talent into the industry including graduates from critical science and technology disciplines (see case study in Box 4.2).
- Skill development within the industry through technology transfer and sharing of technology development, for example through 'demonstration sites' to showcase the results of R&D investment to the industry quite broadly.

#### *Mechanisms for IP management and technology transfer*

- Accelerate the commercialisation of R&D adding to the quantum of innovations available to the industry. IP management within the MDC framework has enabled the transfer of technology broadly through the red meat sector. This is in contrast to other means of private research funding which will often restrict the availability of technology to those organisations funding the research.

#### **Box 4.2: Professional development program case study**

MLA has been implementing the red meat industry Professional Development Program (graduates and undergraduates) since 2002. The purpose of the program is to identify specific science and technology capability gaps within the industry and to attract and retain qualified young professionals to assist industry to address them. Participants within the program are placed within suitable industry enterprises (along the whole supply chain) and the program also includes opportunities to work in R&D/technology provider organisations. Graduates are required to complete R&D projects which benefit both the host company and the industry overall. A number of significant industry-wide innovations have been developed as a direct result of the program. There have been 57 participants in the graduate program with over 80% currently retained in the industry. In addition, 134 students have participated in the undergraduate program, and approximately 20% have gained employment in the industry following graduation. A key to success has been the active involvement of industry enterprises who contribute 50% of their own private funds to support the graduate, including the costs of the graduate's development, mentoring and networking, and the completion of R&D projects. The program has raised industry awareness in relation to the importance of attracting and retaining a pool of more highly skilled tertiary qualified professionals and a significant number of enterprises are now actively engaged in the program. In addition the growing pool of well-trained and 'innovation aware' science and technology professionals now spreading throughout the industry is providing further impetus to uptake of innovation.

#### **4.4.2 Amending levy rates**

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Amending levy rates in the red meat and livestock industry requires a significant majority (determined at the discretion of the Minister) of votes in favour of the change and approval by the Australian Government. Producers must register to participate and their votes are weighted according to their levy contributions.

Since the inception of MLA there have been minor changes to the grassfed beef R&D levy, the grain-fed beef R&D levy has changed several times and the goatmeat industry is currently waiting for approval from the Australian Government to increase their R&D levy. The grainfed beef industry has successfully demonstrated to the Minister stakeholder support for levy changes and have made several changes to the level of their R&D levy. Most recently, in 2008 ALFA gained industry and Government support for an increase in the R&D portion of the levy from \$1.17 to \$1.50.

However, there are many more stakeholders that need to be polled in order to make a change to the grassfed beef, lamb and sheep levies and an effort similar to what recently took place to maintain the additional \$1.50 beef marketing levy would be required. Direct costs associated with the vote on retention of the \$1.50 marketing levy amounted to \$341,205. In addition, an estimated 280 industry days in-kind were associated with six face to face Levy Review Committee meetings and committee attendance at events to communicate findings and recommendations. Finally, significant staff time and travel costs were incurred in attending committee meetings, attending communication events and in furnishing the committee's requests for information.

In order to maintain support for the compulsory levy it is important to have a stakeholder directed decision-making process with broad participation. MLA suggests that alternative, more flexible systems for amending levies could be considered which provide an appropriate balance between efficiency and the critical need for strong and transparent stakeholder control.

#### ***4.4.3 Justification for processor levies***

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As noted, red meat processors also pay compulsory R&D and marketing levies which results in significant industry benefits associated with an integrated and coordinated whole of supply chain approach. The entire red meat supply chain benefits from processors investing in productivity improvements. Red meat prices are set on global markets and the price is heavily influenced by the relative price of substitute proteins (especially pork and poultry) and exchange rates, processors are margin players competing for livestock supply. Therefore, if the processing sector improves its level of efficiency, they become more globally competitive and they demand more livestock from producers, which in turn increases the price of livestock. Consumers also benefit from increases in processing efficiency with higher quality meat and more affordable red meat supply.

The red meat processing industry is heavily regulated and this often results in the need for standardisation of innovation practices across the industry due to the requirements to approve the use of new technologies. Therefore, innovation in the industry is well served by a collective approach through a compulsory levy system which assists in addressing some of the challenges presented by the highly regulated environment. In addition, as the basis for most regulations in the industry are related to public benefits such as food safety, animal welfare and OH&S, there is also a strong justification for matching processor investments in RD&E with government funding.

#### **4.5 Management of intellectual property issues**

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As discussed in Chapter 3 of this submission, the capacity for individual enterprises and the industry overall to appropriate benefits from R&D is a challenge in the rural sector. A key asset arising from investment in R&D relates to intellectual property (IP) and it is clearly important to identify and protect IP where possible to maximise the benefits for the Australian industry and the broader community, without unduly inhibiting the capacity to bring new technologies to market.

MLA aims to manage IP issues effectively in order to maximise the benefits for the Australian red meat industry and the broader community by accelerating adoption of R&D outcomes, facilitating the commercialisation of IP and ensuring that MLA's IP assets are appropriately protected. MLA's approach to managing IP includes the following key elements:

- Early identification of IP to be protected, with a subsequent review as to the appropriate method of protection (patent, copyright, plant breeder rights, confidentiality etc). This may involve a trade off between protection early in the R&D cycle (and subsequent additional costs) as compared to protection closer to commercialisation when the likelihood of commercial success is better known, but protection may no longer be feasible.
- Where R&D is wholly funded by MLA, it is MLA's preference to maintain 100% ownership in relation to IP so as to ensure industry benefit is maintained.

However, in some circumstances a lower MLA IP ownership percentage may be appropriate if external funding or prior investments are included in the R&D.

- MLA ownership of IP allows control of the commercialisation process (e.g. a focus on benefit to the Australian red meat industry) as well as negotiation of an appropriate commercial return where applicable (e.g. for applications of the technology outside the red meat industry, or outside Australia).
- Appropriate exit strategies (e.g. allowing patents to lapse) are determined as soon as MLA's ongoing involvement in managing the IP is no longer deemed desirable or required to maintain industry benefit.
- MLA's strong focus on driving successful adoption and commercialisation involves, where possible, early involvement of commercialisers with the subsequent transfer of IP protection costs to these partners. This approach minimises IP protection costs, with IP protection such as patents conferring significant commercial benefits to a commercial partner.
- While MLA may grant exclusive IP rights to commercialisers, a 'right to reclaim' provision of the IP for non performance by the commercialiser is always negotiated.
- Lower or no royalty payments may be applied to the Australian red meat industry compared to those imposed on use of the IP in other industries or outside Australia. This is determined on a case-by-case basis with the aim being to bring overall benefits to the wider industry.
- MLA maintains core internal professional expertise to assist in managing IP and utilises specialist external services such as patent attorneys where necessary. Internal management and reporting systems which track IP, commercial agreements and licensing arrangements are also in place.

While there are challenges regarding Intellectual Property issues when there are multiple parties (RDC's, CRC's, universities etc) involved in a large R&D program e.g. sheep genomics, overall it is considered that the current approach by RDCs such as MLA do not give rise to any particular difficulties in bringing new technologies to market.

MLA has identified the key challenge in relation to effective commercialisation of R&D outcomes is more directly related to the relatively low levels of commercialisation capacity and capability available to service the Australian red meat industry. In particular, our ability to attract suitably qualified commercialisers has been inhibited by:

- The small size of the Australian market making us unattractive to large international technology companies
- The general decline in Australia's manufacturing sector leading to a diminishing pool of sophisticated engineering companies available to support R&D outcomes which include advanced manufacturing technologies such as robotics
- Difficulty in attracting science and technology graduates into the industry

In recent years, MLA has taken steps to address these deficiencies by actively seeking out new commercialisers and facilitating their entry into our industry through funded technology transfer initiatives and graduate exchange programs.

## **5 Is the RDC model fundamentally sound?**

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### **5.1 Overview**

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MLA considers that the RDC model is fundamentally sound and it has clearly demonstrated its capacity to deliver benefits to industry and the broader community. The model has proven to be flexible and to allow for adaptation as the needs of government and industry stakeholders have evolved.

This submission illustrates the unique role that RDCs play within the overall rural innovation system and addresses a number of the specific issues raised by the Productivity Commission. In particular, the need to maximise the effectiveness of interactions between various elements within the rural R&D system through effective coordination and collaboration is discussed in detail with specific MLA case studies included to support key arguments.

The submission acknowledges that some aspects of the model could be further refined to ensure that rural RD&E is delivered via the most effective and efficient structural arrangements within the broader innovation system. However, MLA believes that fundamental changes to the model are not warranted and that any deficiencies can be addressed through minor modifications to the current framework. A number of opportunities to improve and enhance the RDC model are discussed.

### **5.2 Introduction: A systems view of rural RD&E policy**

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While economic models based on the concept of ‘market failure’ are important in determining (and justifying) broad areas for government investment within a particular area or industry (see arguments presented in Chapter 3), it can be argued that they are too blunt an instrument when it comes to determining how government policy can best be delivered. In fact, traditional economic frameworks provide little, if any guidance on how governments should intervene, which policy instruments to apply, specifically where investments should be directed, or which structural arrangements will be most effective. This is particularly the case in innovation policy, which deals with the necessarily uncertain process of producing new sources of economic, social and environmental value, involving multiple and distributed forms of knowledge (Lundvall 2007). Applying a market failure framework to the analysis and development of innovation policies can lead to prescriptions which fail to capture ‘the dynamic complexity of the systemic combinations that emerge to address innovation problems in particular national contexts’ (Dodgson et al 2010: 4).

As noted by Bryant (1998) however, there is increasing pressure on government policy makers to ensure that innovation policies are efficient, cost-effective and that they deliver real impact in terms of enhancing industry performance and delivery of public benefits.

The concept of innovation systems and more particularly the notion of ‘system failures’ provide appropriate analytical frameworks that encapsulate contemporary understanding of the core characteristics of the innovation process. Systems approaches acknowledge the complex evolutionary nature of economic evolution driven by processes of innovation. They recognise that each innovation problem is more than simply an invention problem because it also requires invention to be commercialised through a market diffusion process. Complex evolutionary perspectives emphasise that



different forms of knowledge are essential to this process. Specifically, the different kinds of knowledge required for effective innovation extend beyond scientific, engineering and technological knowledge to span ‘translational knowledge’ related to the knowledge of product and markets that is also required to demonstrate the validity of a concept and transform it into a market reality (Dodgson et al 2010). The knowledge required for innovation, in this view, is diverse, distributed across many individuals employed in different organisational contexts, and subject to constant change as problems are solved and new problems emerge.

Systems approaches to innovation propose that individual enterprises cannot undertake effective innovation activities in isolation. Specifically, their decision-making around innovation must involve complex interactions with an array of variables and other entities within their environment which are mostly outside their control and which may impact significantly on the success or failure of their innovation efforts. These external variables and entities include:

- Customers, consumers and competitors
- Other industry enterprises and supply chain partners
- Universities and research institutes
- Technology providers
- Knowledge brokers and consultants
- Industry bodies (employer groups and trade unions)
- Government policies and regulations
- Innovation investors (public and private)

Key to the effective functioning of an innovation system is the mechanisms and processes whereby all relevant forms of knowledge are developed, coordinated and ultimately distributed within the system.

The systems approach to understanding innovation at the national level is clearly embedded in the Australian Government’s innovation policy (*Powering Ideas* 2009). However, complementary to this approach is the concept of ‘sectoral innovation systems’ which are considered to be critical to the development of effective innovation policy and interventions within specific industry groups (Malerba 2004; Scott-Kemmis et al 2005). It is now widely recognised within contemporary innovation literature that a properly functioning sectoral innovation system is essential to underpin the capabilities of individual enterprises and supply chains in order to provide access to all the relevant forms of knowledge, from disparate sources, required for effective innovation.

The specific attributes and functions within an innovation system which are likely to impact (both negatively and positively) on individual enterprises and an industry sector overall include:

- Effectiveness of industry-university linkages and the availability of trained scientists and engineers in specific sector required disciplines.
- Strength of the sector’s capacity in relation to the generation of new knowledge and the absorptive capacity of enterprises within the sector to convert ideas and knowledge into value-creating outcomes (determined by overall sector culture plus the presence of a critical mass of innovative enterprises).

- Availability and mobility of skilled labour.
- Perceived attractiveness of the sector to the finance community and the sector's access to innovation capital.
- Sectoral patterns of regulation and competition.

Ultimately the level of innovation adoption and successful entrepreneurship occurring within an industry sector will determine the degree to which that sector transforms itself and maintains ongoing global competitiveness. This recognition has led to a strong focus in the literature on organisational capabilities in innovation (Dodgson et al 2010: 39) and increasing acknowledgement of the behavioural constraints on their development which can include: myopia; excessive risk aversion; and status quo bias (Potts & Morrison 2009). In particular, there is growing evidence of a strong positive relationship between a company's attitude to learning and its entrepreneurial orientation, which in turn drives the propensity to innovate (Jolly & Therin 2007).

The systems approach to understanding innovation at the national, sectoral and organisational levels thus identifies a set of potential failures that are not captured by the standard market failure framework. Generally, systems failure occurs via constraints on the capabilities of firms and elements of the innovation system to effectively coordinate into a functional system. This is most likely when innovation occurs over a network of businesses and thus depends upon the connections between each and the integration of the whole (Drejer 2004). Examples of systems failure include missing institutions, failed connections, low or absent co-ordination amongst relevant knowledge sources, business model incompatibility across the innovation value chain and failure of new knowledge to be successfully retained (Potts & Morrison 2009).

Edquist et al (2004) argue that it is essential that policy makers understand the nature and cause of system failures before determining where investment and interventions may best be directed. This highlights that the innovation systems approach adds complexity to the policy process itself and places greater emphasis on building competence among policy and intervention agencies. Policy makers clearly require higher levels of sophistication and greater depth in their knowledge bases if public investments in innovation are to deliver the desired results. As will be discussed in Section 5.3, RDCs play a critical institutional role in facilitating sectoral innovation and in supporting achievement of government policy objectives within the overall rural innovation system.

### **5.3 Unique role of RDCs within the rural innovation system**

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Based on the above approach to innovation policy development and an understanding of the rural sector's innovation system, it can therefore be argued that RDCs are uniquely positioned to facilitate, coordinate and optimise the complex interactions required at the level of their individual rural industry sectors. Three attributes of the RDC structure are key in enabling them to deliver a core 'systems integrator' role within their relevant innovation systems:

1. **Integration across public and private interests:** As recipients of Australian Government funding, RDCs can be viewed as key policy instruments within the national innovation agenda. As industry-funded bodies, RDCs also serve as a key mechanism for industry engagement. Within this context, RDCs operate as an innovation policy instrument that straddles both the public and private spheres.

2. **Independence:** While RDCs are accountable to both public and private stakeholders, a key aspect of their structure is independence in perspective and scope of responsibility. As primary facilitators of future-oriented research and innovation across the value chain, RDCs could be said to be uniquely positioned as representing the long-term interests of the industry while complementing the objective of government to deliver specific public good priorities.
3. **Driving entrepreneurship:** As a co-investor with commercial partners in delivering innovations to the marketplace, RDCs have a mandate to operate in the broader entrepreneurship domain. This is ultimately how the benefits of effective innovation policy and strategy achieve traction in terms of accelerating industry competitive advantage, building sectoral innovation capability and ensuring delivery of broader public social and environmental priorities.

The role of RDCs as ‘systems integrators’ within their specific rural industry sector is a dynamic role that evolves as industry and government issues shift in response to changing external conditions. In addition, the integration role of RDCs complements and optimises the contribution of other elements within the system such as R&D providers; Cooperative Research Centres (CRCs), technology commercialisers; public and private extension agencies; financial institutions; and government policy agencies who all play a critical role in the development and delivery of new knowledge and innovation opportunities. However, it is only RDCs that can act to integrate and coordinate across all these disparate elements in such a way as to translate both industry needs and government priorities into a meaningful and well functioning innovation system.

It is noted that a major criticism of the rural R&D system prior to the development of the RDC model was that research priorities for rural R&D were being set primarily by scientists and measured according to scientific professional priorities such as publications (Lovett 1997). The emergence of the RDC model therefore reflected a significant shift in the mechanism by which rural R&D investments were determined from the previous ‘science-push’ approach predominantly driven by research institutions to an ‘industry-driven’ philosophy more likely to gain traction with industry players and thus to ensure results are adopted. In 2003, the Centre for International Economics found that there had been a very positive shift in the effectiveness of the rural R&D system specifically as a result of the evolution of the RDC model which demonstrated the following distinguishing features:

1. RRDCs play a key leadership role in the planning and managing of R&D for specific industries.
2. It is not a ‘grants’ model as RRDCs treat funding as an investment in economic, social and environmental benefits.
3. The model delivers a high rate of return on R&D via facilitation of interaction along the innovation chain.
4. To achieve this rate of return there must be a focus on translating research outputs into practical outcomes.
5. A strategic approach is applied to implementing R&D portfolios rather than an *ad hoc* approach to project approval.
6. There is a dominant (but not exclusive) focus on applied research.
7. High levels of accountability to key stakeholders and the broader community are apparent.
8. The need to take a broad supply chain approach (farm-to-consumer) has been recognised and is being progressively implemented.

This submission therefore asserts that RDCs are a key strength of the rural R&D system and that they have demonstrated their capacity to play a critical systems integrator role in terms of ensuring that:

- Multiple opportunities for industry input and engagement exist at all levels.
- The most effective interface and integration exists between industry and R&D providers and that industry specific needs drive strategic investment decisions. This ensures that research outputs can be efficiently translated into industry relevant outcomes, something that R&D providers are generally unable to achieve.
- Alignment of industry R&D investments with government R&D priorities is facilitated by strong industry-government partnership arrangements.
- The RDC model supports a whole-of-industry approach where R&D and innovation is customer-consumer driven and delivers better outcomes.
- There is coordination of the various entities that provide specific services within the rural RD&E framework and opportunities for collaboration are identified and optimised.
- There is the development of integrated sectoral innovation strategies which include a balanced portfolio of both long-term strategic R&D with shorter term applied R&D and which optimise opportunities for leveraging outcomes across R&D projects. To maintain an appropriate balance within the red meat industry, MLA considers both 'top-down' (strategic government and industry) priorities and 'bottom-up' (research provider, industry group and grassroots producer) ideas in developing an investment portfolio and sets indicative investment targets for strategic applied (20 per cent of available budget), development (55 per cent) and extension/adoption (25 per cent) projects.
- Investment decisions are separated from R&D providers, thereby retaining a high degree of objectivity and increasing the likelihood of R&D outcomes addressing industry and government needs.
- There is a national approach that recognises regional and industry diversity.

In the absence of RDCs, the rural RD&E landscape would be vastly different and, as summarised in the following table, there would be a significant and unacceptable reduction in the delivery of benefits to industry and government.

**Table 5.1 Impact of removing RDCs from rural innovation system**

Characteristics of the current RCD model	Counterfactual – absence of RDCs
Balanced consideration of social, industry and private benefits	Consideration of social benefits would override industry issues with a resulting negative impact on agricultural productivity and competitiveness
Responsive to changes in RD&E needs (based on government, national and industry priorities)	RD&E focused on government priorities and providing public benefits, likely to result in misalignment with industry priorities

Government's R&D contribution with industry levies provides incentives for the industry to invest in RD&E across a broad range of public-private benefit areas	Absence of targeted, industry-specific RD&E likely to result in under-investment and negative impact on productivity growth
Government's R&D contribution combined with private voluntary contributions (such as via the MLA Donor Company) provides incentives for companies to increase their investment in R&D	Lack of incentives for companies to invest in R&D likely to result in under-investment and negative impact on productivity growth.
Well-established and comprehensive technical expertise networks and in-company expertise to assess RD&E proposals	Lack of required networks and expertise will increase the difficulty in effectively assessing RD&E proposals
Cross-collaboration across the R&D framework – fosters leveraging of funding and breadth of audience for RD&E	Absence of collaboration across agricultural sectors (due to the absence of RDCs) likely to result in inefficient allocation of resources and research duplication
RD&E is demand driven and outcomes focused	Threat of R&D reverting to being supply driven and not relevant for neither industry nor outcomes focused.
Responding to changes in public/private funding mix by creating clear boundaries for both but also encouraging participation of both	No coordination to foster participation of public and private sector entities. Lack of incentives for private sector to invest in areas of public good or broad extension activities. DPIs further stretched. Likely to result in inadequate extension activities and will impact productivity.
National perspective, but with understanding and co-ordination of regional issues and priorities	CSIRO and DAFF have a national perspective. State DPIs and universities have state focus. Absence of an overarching entity that co-ordinates both national and regional priorities.
Whole-of-supply chain focus	RD&E likely to have a narrower focus, concentrated on on-farm programs. Researchers disconnected from supply chain companies, therefore, less effective at increasing industry competitiveness.

## 5.4 Effectiveness of the current RDC model

The Productivity Commission has raised the question of whether the RDC model is fundamentally sound. This submission asserts that the current RD&E framework, supported by the RDC model, has clearly demonstrated the capacity to deliver benefits to industry and the broader community as evidenced by:

- Australian agricultural land productivity has been improving faster than the average for developed countries (Alston et al 2000a).
- The collaboration between MLA and RD&E agencies (including state and territory Departments of Primary Industries, CSIRO, the Cooperative Research Centres and universities) has been effective in improving on-farm productivity, product quality and feedlot sustainability. The \$98 million invested by MLA (including Australian Government contributions) between 2000 and 2007 on increasing efficiency and productivity in beef production has contributed to improved on-farm productivity, product quality and feedlot sustainability, generating an additional \$374 million in industry value (CIE 2009b).
- MLA and state and territory DPI investments are estimated to be responsible for between 40–80 per cent of observed and forecast productivity growth in Australia between 2000 and 2015. MLA and DPI funding would also facilitate animal welfare and productivity gains over this period through feedlot compliance with the National Feedlot Accreditation Scheme.

#### ***5.4.1 Flexibility to adapt to specific industry needs***

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The adaptive capacity of institutions in responding to ongoing changes in the economic, policy and science/technology landscapes is increasingly recognised as a key determinant of innovation system success (Metcalf 2007). The current RDC model has demonstrated flexibility which has enabled RDCs to evolve and adapt to the changing needs of individual industries. For example, in the red meat and livestock industry the RDC framework has accommodated the merging of marketing and research into MLA. It has been the experience of the red meat industry that this integration has proven to be extremely successful in facilitating and reinforcing customer-driven innovation through the whole of the supply chain and has been the source of many of the most important breakthroughs in the red meat industry. The integration of R&D and marketing ensures that R&D works in concert with production, processing and marketing initiatives and creates greater efficiencies and adoption of R&D outcomes.

Similarly, in the red meat industry a unique whole of supply chain model of RDCs has evolved in which separate meat and livestock RDC organisations exist, and are needed to manage processor levies (AMPC) and live exporter levies (LiveCorp). While inevitably tensions can arise between various sectors within an industry, these independent organisations ensure strong linkages are maintained between the levies processors and live exporters pay and the projects these levies fund, thus ensuring continued support for investment by each sector in RD&E. Both organisations however have obtained efficiencies through reduced overheads and administrative costs by recognising MLA as the key R&D and marketing service provider (and sole recipient of government matching R&D funds).

The structure represents a collaborative model that has delivered a number of significant benefits including: ensuring key industry programs are integrated along the supply chain; governance arrangements are simplified for government in relation to matching dollars; sovereignty and independence of decision-making are maintained for each sector which underpins ongoing support for levies and industry programs; ensures investment decisions are strategic along the supply chain and not limited by narrow 'sectoral interests'; reduces duplication; significant administrative efficiencies; and supports a consistent evaluation framework.

### ***5.4.2 Flexibility to respond to changing role of government***

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Furthermore, the framework has been flexible against the backdrop of the changing roles of the public and private sector in regards to RD&E, particularly over the past three to five years as the budgets of state DPIs have come under acute pressure. In response, the framework has enabled MLA to become more involved in ensuring areas of critical RD&E importance are maintained while helping to foster the provision of services by DPIs and private providers.

The impact of reduced State Government funding on RD&E is likely to be mainly felt in the area of extension. However, it is unlikely MLA will ever fill the gap one-for-one in regards to extension as it is estimated that MLA contributes approximately 10 per cent to total on-farm RD&E investment while DPIs currently contribute 90 per cent.

The degree and manner in which RDCs backfill any loss in capacity of DPIs needs to be assessed in light of who is best placed to undertake the different elements of RD&E, including consideration of the relative levels of public, industry and private benefit arising from RD&E investment. Also, as the overall level of funding diminishes, ex ante modelling, mid-term evaluation and ex-post analysis will increase in importance to ensure the available funds are allocated or reallocated effectively.

In light of this changed environment, and with the formalisation of the National RD&E Strategies, RDCs are increasingly well positioned to address the extension balance and integration between the public and private sectors by:

- Promoting more consistency in extension methods and activities
- Fostering a 'user-pays' culture in receiving personalised (private-benefit) services
- Fostering sustainable and effective private sector extension capacity in the long-term

MLA's key response to these funding pressures has been to:

- Encourage DPIs to continue resourcing activities in certain extension areas and at levels that reflect the true costs of delivery
- Encourage private sector involvement in extension, and DPI integration and interaction with this sector
- Assess and commission extension projects based on their alignment with government and industry priorities
- Ensure future proposals undergo rigorous ex ante evaluation and assessment against triple bottom line principles

MLA's *Guidelines for Investment and Co-investment in Extension* endeavour to help MLA respond to these funding pressures. Going forward, it will be important for the whole rural RD&E community, including federal and state governments, and RDCs, to closely monitor the total investment effort and consider strategies to replace falling state inputs if the private sector does not completely fill this gap.

## **5.5 Are modifications to the RDC model warranted?**

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MLA does not consider that there is evidence to suggest that the RDC model is no longer fundamentally sound. While there may be opportunities to continue to evolve and enhance the RDC model with minor modifications, it is believed that the following elements of the current model must be maintained:

- Mechanisms to retain specific sector responsibilities and focus are deemed critical. It is acknowledged that there may be an opportunity for some greater level of aggregation but if this option is considered by the Productivity Commission, it will be critical to evaluate whether key industry engagement will be compromised in any amalgamation (size alone should not be considered to be the principal criteria). As noted, in the red meat industry, the current arrangements which include three RDCs (MLA, AMPC and LiveCorp) has proven to be very effective in terms of maintaining strong levels of industry engagement along the value chain within a strong collaborative and administratively efficient framework.
- A whole-of-supply chain approach is critical and RDCs should not be limited to an on-farm focus.
- A broad R&D and innovation agenda is important and government and industry investments should be maintained along the continuum from strategic and applied R&D through to adoption, commercialisation and capability building.
- Independent governance arrangements including skills-based boards.
- Integrated approaches to both public and private objectives. It is not considered appropriate to attempt to separate these as this will compromise uptake and ultimately diminish achievement of government policy objectives.
- Strong industry-government partnerships supported by matching dollars (at least at current levels) plus mix of compulsory levies and voluntary contributions.
- Opportunity for integrated marketing and R&D functions for those sectors where this is deemed important.
- Continued separation of investment decisions from R&D providers (demand-driven not supply-driven R&D).
- Opportunities to extend international partnerships and alliances.
- Continued support for building capability within both public (eg state DPIs and CSIRO) and private RD&E provider networks.

More fundamental changes to the RDC model (or 'half-way' approaches as suggested by the Productivity Commission) do not appear to be either warranted or appropriate.

## **5.6 Maximising effort across systems and amongst multiple entities**

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Innovation is most likely to occur as a result of integration and co-operation among different types of entities who command complementary knowledge, resources and competencies (Dodgson et al 2010). There is therefore an increasing emphasis on the importance of building effective interactions and networks within innovation systems in order to maximise opportunities for collaboration and to ensure an efficient and coordinated utilisation of scarce resources (Cowan 2006).

It is noted that as the demands of innovation increase and enterprises require greater access to knowledge about markets (consumers, customers and competitors) and key scientific and technological developments, then knowledge acquisition and learning processes (seen as core 'innovation processes') will become increasingly decentralised, externalised and internationalised (Coriat & Weinstein 2004; Chesbrough et al 2006).

As noted in the Productivity Commission Issues Paper (and previously in this submission), the rural innovation system is made up of multiple elements including RDCs; CRCs; universities; major public institutions such as CSIRO; state departments;



and a range of private providers. Clearly it is important that the efforts of each of these system elements are optimised across the innovation network to avoid unnecessary duplication and to ensure limited resources are utilised to maximum effect. As systems integrators, RDCs are the entities in the network that can act as ‘hubs’ and ‘bridges’ to maintain optimal connectivity and co-ordination across distributed and varied sources of knowledge and opportunities (Gluckler 2007).

### ***5.6.1 Coordination and collaboration mechanisms***

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Effective coordination and collaboration (where appropriate) are clearly important mechanisms within the overall functioning of the rural innovation system as they assist in ensuring that:

- RD&E outcomes are maximised within the context of scarce resources
- Expertise and investment are leveraged across research organisations and across R&D projects

In recent years there have been several parallel initiatives established to improve the effectiveness of R&D collaboration and coordination across the rural RD&E system as follows:

#### ***1. Council of Rural R&D Corporations (CRRDC)***

The RDCs themselves have identified the need for greater coordination and collaboration and have responded by establishing a mechanism via the CRRDC which is aimed at providing strategic leadership for collaborative, effective and efficient investment in rural RD&E by:

- Working together to maximise collaboration and co-investment that meets government priorities
- Ensuring effective and efficient delivery of primary industry RD&E investment
- Providing an effective national voice on issues affecting RDCs
- Developing a consistent evaluation framework to measure and report industry and community benefits arising from rural R&D investment
- Exploring opportunities to achieve administrative efficiencies via greater harmonisation

#### ***2. National Primary Industries RD&E Framework***

The National Primary Industries RD&E framework is a commitment between the federal and state governments, RDCs, universities and scientific research institutes to:

- Establish a shared direction and priorities for rural RD&E at national and sector level
- Take a holistic approach to public research capability that will better integrate research provision and skill development with these agreed priorities
- Improve the effectiveness and efficiency of RD&E delivery and hence returns on investment (by promoting platforms that can convert national research outcomes into effective regional level development and extension activities)

### *3. Rural Research and Development Council*

The Rural R&D Council was established by the Minister for Agriculture, Fisheries and Forestry (Hon. Tony Burke) in 2009 to:

- Develop a national strategic Rural R&D investment plan based against agreed national priorities
- Establish a performance measurement and reporting framework for rural R&D
- Provide advice on enhancing cross sectoral, cross jurisdictional collaboration
- Provide advice on improving uptake of new knowledge and technology
- Foster capacity building in the rural R&D sector

All three of these initiatives reflect a common recognition among government and industry that:

- Existing rural RD&E capacity has been stretched both by funding pressures, and competition from other sectors thus highlighting the importance of maximising the efficiency of existing structures and investments.
- The future challenges (for example, climate change) confronting agriculture highlight the need for increased cross sectoral understanding and cooperation in developing cost-effective responses to assist government achieve broad policy objectives.
- The increased complexity of the debate on food security and other broad social issues requires agriculture to develop new innovation pathways into areas beyond traditional productivity drivers (eg the role of genetics in improving productivity versus issues around health, production system ethics etc).

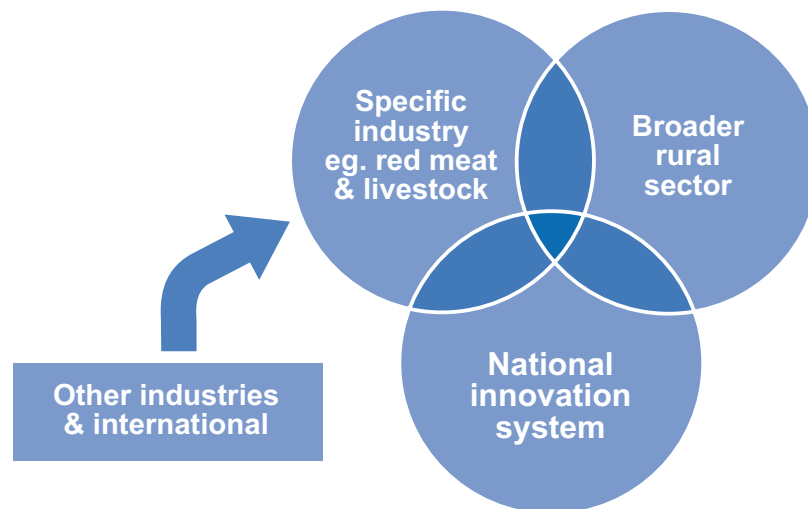
It is noted that collaboration occurs most readily when there is obvious overlap and synergies in terms of achievement of objectives and when collaborating parties are able to share complementary resources and competencies. However, collaboration can often be impeded when problems arise related to contractual and IP negotiations which can lead to prolonged delays and compromises that may be unacceptable to one or more parties. It is ultimately up to potential collaborators to determine whether the benefits derived from a collaborative partnership will outweigh these transaction costs. Notwithstanding these challenges, MLA considers that the existing RDC model has demonstrated a strong record of collaboration both within the RDC group and more broadly between RDCs and other elements of the rural RD&E system.

#### ***5.6.2 Coordination and collaboration at multiple levels***

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It is important to note that coordination and collaboration are not ends in themselves and that within a complex innovation system there is a need for integration and coordination at multiple levels. It is proposed that in assessing the opportunities for collaboration and coordination within the rural innovation system and in identifying areas for further focus and improvement, the following framework may be helpful.

**Figure 5.1: Framework for identifying opportunities for collaboration and coordination across and within innovation systems**



As implied by this framework, collaboration and coordination can be seen to apply at a number of levels including:

- Within the specific industry sector – involving public-private partnerships. It is argued that responsibility for identifying and facilitating opportunities for collaboration and coordination within a specific sectoral innovation system is the role of individual RDCs.
- Within the broader rural community – an example of this is the role played by the CRRDC in coordinating efforts across RDCs where this appropriate. It could be assumed that the National RD&E Framework plus the Rural R&D Council will also play a role here.
- There is a need for interaction/coordination between the various innovation systems depicted above. An example would be the interaction between the collective RDC framework and the broader national innovation system.
- International collaboration and interaction with the knowledge bases of completely different industries are increasingly seen as important sources of innovation. However, as these opportunities are most likely to be specific to individual industry groups, coordination and facilitation of collaboration at these interfaces is also seen to be most effectively managed by individual RDCs on behalf of their respective industry sectors.

It is noted that collaboration can take many forms in relation to leveraging resources (financial, human, knowledge) beyond a simple co-investment model.

MLA has not identified any major areas where opportunities for collaboration within the rural innovation system appear to be particularly constrained. However that is not to say that further opportunities for collaboration do not exist and should not be explored in the future.

### ***5.6.3 Coordinating function of Council of Rural R&D Corporations***

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It is MLA's view that the CRRDC provides a suitable mechanism to assist RDCs to identify further opportunities for collaboration and in addition, to provide a coordinating function where this is deemed appropriate. MLA considers that the CRRDC coordination role can continue to evolve with a focus on the following areas:

- Facilitating collective engagement by RDCs in the strategic assessment and delivery of broad rural R&D priorities. This includes: assisting government to establish clear and measurable rural R&D priorities; maintaining linkages with the Rural R&D Council as they develop the National Strategic Rural R&D Investment Plan; and providing an interface with the National RD&E Framework as required. (It is noted that there may be potential for overlap and duplication between these various mechanisms. MLA considers that competing approaches to coordination are unlikely to deliver an optimal way forward and that a common and agreed approach will be essential).
- Assisting RDCs to optimise their collaborative efforts in broad cross-sectoral initiatives.
- Creating stronger linkages between rural R&D and other government programs and departments.
- Improved communication of the benefits and outcomes of rural R&D to government and the community.
- Assisting RDCs to identify common areas of skills gaps (particularly in core science and technology areas) and to develop coordinated programs to address these gaps.
- Ongoing emphasis on measurement and evaluation of outcomes of rural R&D and the sharing of knowledge and lessons learned.

### ***5.6.4 International collaboration***

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MLA considers that international collaboration is critical given the relative size of Australia's R&D capacity and the global nature of the industry we operate in. In view of this MLA has proactively developed a portfolio of international partnerships and initiatives specifically to increase the level of innovation available to the red meat industry (see Section 5.7.5).

However, international R&D collaboration is potentially complex and there is often tension between benefits and potential loss of competitive advantage. In MLA's experience, global collaboration generally requires a new mindset and culture and there is a need to build industry capability and suitable methodologies to facilitate the implementation of open innovation approaches. In addition, due to the relatively small scale of Australia's total R&D effort, it is often difficult to attract potential international partners.

Government can play an important and supportive role in assisting RDCs to increase their participation in international collaborations by:

- Providing additional focus and support in this area
- Generating greater awareness of the benefits and opportunities for international collaboration

- Facilitating communication of lessons learned via innovative case studies

In consultation with DAFF, MLA has developed a number of key principles for collaborations with international entities as follows:

- Alliance must not impact on or compromise any high level diplomatic or political policy position.
- Program/project must clearly address an area of industry and government R&D priority.
- Contractual agreements are likely to be complex in the case of international partnerships and benefit to Australian industry must therefore be clearly documented and protected within agreements.
- Any potential 'downside'(eg loss of competitive advantage) must be identified and mitigated.
- Ownership of Intellectual Property must reflect Australia's contributions and must facilitate extension of benefits to Australian industry.
- Risks that potentially impact on benefits for Australian industry must be identified and risk management plan documented.
- Route-to-market for Australian industry must be agreed in advance including rights to IP and commercialisation for benefit of Australia. Restrictions on use of IP outside immediate partnership agreement must be specified.
- Specific components must be included in agreement to build capability within Australia both within industry and the R&D community.
- MLA must share appropriately in income derived from successful project outcomes.
- International projects involve additional complexities and therefore all international partnership projects require an agreed management and monitoring structure to be agreed prior to commencement.
- Appropriate level of Australian industry input and consultation into project design and implementation.

MLA believes there is scope to continue to expand collaboration with international partners and we are taking steps to more formally open-up these opportunities via:

- Increasing opportunities to participate in global knowledge exchange networks
- Developing a more structured approach to international technology scanning
- Evaluating and documenting successes in international collaboration – including lessons learned and creating better visibility of these successes at both government and industry levels.

MLA has demonstrated that successful international R&D/innovation collaboration can occur within the current RDC framework. However, we also believe that there are many more opportunities for international collaboration and that these should be explored and encouraged. While there are no specific inhibitors for international collaboration we strongly suggest that government should take a more proactive role and should seek to create specific opportunities and incentives to encourage RDCs to more actively engage in this area.

## 5.7 MLA's role in collaboration and coordination

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When analysing coordination and collaboration from the perspective of the red meat and livestock industry, it is useful to distinguish between joint effort that occurs within a single industry, for example, sheep research; joint effort that occurs across related industries, for example, ruminant industries or industries that commonly co-exist on a single enterprise (wheat and sheep); and joint effort that occurs across the rural sector (often referred to as cross-sectoral).

### 5.7.1 Industry specific collaboration

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MLA (and previously MRC) has a long history of collaborating with other research organisations on industry specific RD&E. This has involved MLA interacting extensively with the other red meat and livestock industry related RDCs (LiveCorp and AMPC) and external entities (CRCs, CSIRO, DPIs, universities and the private sector). As a result there are strong systems in place to identify potential gaps in RD&E and guard against duplicating efforts.

Some examples of mechanisms in place to identify gaps and prevent overlaps in RD&E programs in the red meat industry include:

- In the case of on-farm R&D, MLA consults with industry – including the Southern Australia Beef Research Council (SABRC) and the North Australia Beef Research Council (NABRC) – and other research organisations (including rural R&D corporations, CRCs, CSIRO and DPIs) to avoid research duplication and ensure joint approaches are carried out to address common problems.
- The National Primary Industries RD&E Framework also facilitates the identification of key on-farm research overlaps and gaps. In the case of the National Beef and Sheepmeat Production RDE Strategies within the broader framework, there is ongoing consultation with industry and the collating of R&D ideas and current gaps via the Red Meat Co-Investment Committee.
- The establishment of 'centres for excellence', with key R&D being carried out by these hubs across core RD&E program areas and the formal endorsement by PISC agencies of each strategy reduces the likelihood of duplicative activities.
- In the case of off-farm R&D, MLA collaborates with AMPC to translate industry and government priorities into effective innovation strategies and programs that foster greater levels of collaboration across the red meat supply chain; deliver measurable productivity gains to meat processors; and ensure public benefits are achieved in a broad range of areas including reduced environmental impact and improved occupational health and safety.

### 5.7.2 Collaboration across related industries

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Collaboration has also proven effective for RD&E projects that address issues common to related industries, for example, the Reducing Emissions from Livestock Research Program (see Box 5.1) which is a collaboration of ruminant livestock industries to address the common problem of methane emissions.

### **Box 5.1: Reducing Emissions from Livestock Research Program (RELRP)**

RELRP is an example of a program where MLA collaborates with two other RDCs, the CSIRO, five universities, one CRC, one DPI, and an R&D institute. Within RELRP, major research groups in Australia with expertise in the science of rumen biology and livestock management are collaborating to develop practical on-farm options for reducing methane emissions from livestock and quantifying the level of abatement achievable while at the same time increasing productivity. In addition, research is being undertaken to develop technologies to reduce greenhouse emissions from animal waste in feedlots.

In addition to our involvement as a collaborator, MLA is coordinating the program on behalf of, and in partnership with, the Australian Government. RELRP is funded via DAFF's Climate Change Research Program.

Grain & Graze (see Box 5.2) is another collaborative effort that addresses the issues faced by mixed farming enterprises.

### **Box 5.2: Grain & Graze**

The Grain & Graze program was an initiative involving producers and catchment groups in Australia's wheat-sheep zone to improve on-farm profitability and productivity while also achieving local catchment management targets. Grain & Graze was a joint initiative between MLA, Grains Research & Development Corporation, Australian Wool Innovation and previously Land & Water Australia along with over 60 farmer and Landcare groups, research providers and regional management authorities.

The key objectives of Grain & Graze were more profit for broadacre farmers (especially from the pasture phase of rotations), better water quality (eg reduced recharge through using deep-rooted pastures) and enhanced condition and diversity of plants and wildlife on farms and across catchments. The Grain & Graze partners worked together to share the significant amount of information and knowledge that was already available on how to best manage farming systems within a catchment context.

More than 6,000 producers actively participated in Grain & Graze learning activities. Research from the program demonstrated that adoption of Grain & Graze technologies can deliver an average increase of 9 per cent profit. In addition, in line with the aims of the program, more than 200 regional tools and fact sheets were developed to assist producers better manage their feed base of crops and pastures; improve their whole farm economics; improve the management of their natural resources; and increase productivity.

### ***5.7.3 Cross-sectoral collaboration***

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While MLA has witnessed first-hand the effectiveness of collaborating on industry-specific and related industries' RD&E, collaboration to address cross-sectoral issues has proven to be more complex and problematic. It may be that improved coordination (rather than increased collaboration) may be a more appropriate mechanism for addressing the majority of cross-sectoral challenges. This is partly because transaction costs can become overly burdensome when collaborations involve a large number of entities. But more importantly, cross-sectoral problems will likely require tailored responses from different industries. For example, while climate change is a common challenge for the rural sector, the required response of extensive livestock operations like cattle, sheep and goats is fundamentally different to the requirements of cropping

and horticulture operations. While most cross-sectoral issues will be best addressed through enhanced coordination mechanisms, instances may arise where cross-sectoral collaboration is required and the current RDC framework is considered to be flexible enough to facilitate this.

#### ***5.7.4 Collaborating with CRCs***

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CRCs play an important role in the rural RD&E framework, particularly in relation to providing a mechanism for bringing researchers and end-users together to undertake strategic R&D. The CRC mechanism has been found to effectively overcome some of the specific innovation system failures experienced within the overall national context including:

- Need for critical mass
- Overcoming fragmentation caused by distance and a smaller research base
- Bringing together different perspectives, skills and experience
- Breaking down silos (particularly within scientific disciplines)
- Fostering cross-disciplinary interactions
- Facilitating skills and knowledge transfers
- Managing risks
- Promoting mutual understanding

As noted previously, the role of CRCs within the rural innovation system is a complementary role to that of RDCs (particularly given the narrow research focus and time-limited nature of CRCs). In the recent review of the CRC (Commonwealth of Australia 2008) it was noted that CRC programs have had the strongest whole-industry impact where there is strong drive from a strong industry intermediary. RDCs were specifically cited as being particularly effective in this role.

Reflecting the importance of CRCs, MLA is the main non-government external cash funding provider in the Beef CRC and an equal leading funder of the Sheep CRC. Over the past 12 years, MLA has provided funding to: Beef CRCs I, II and III, Sheep CRCs I and II, Plant Based Management of Dryland Salinity CRC, Future Farm Industries CRC, Australian Weed Management CRC, Invasive Animals CRC, Tropical Savannas CRC, Molecular Plant Breeding CRC and the Environmental Biotechnology CRC (in collaboration with AMPC).

Whereas CRCs have expertise in carrying out strategic research, MLA's strength is its industry networks which ensure research remains relevant and a holistic approach to the industry, both geographically and across the supply chain. MLA draws on industry knowledge and experience to assist in framing the industry problem to be tackled by the CRC. Once solutions to the problem are generated, MLA's role is to drive uptake of these solutions by communicating outcomes to producers and processors and coordinating extension efforts.

#### ***5.7.5 International collaboration***

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As noted, MLA considers that international collaboration and partnerships are critical and can provide significant benefits to the Australian red meat industry including:

- Access to valuable IP developed elsewhere



- Acceleration of R&D and innovation adoption
- Reducing risk of R&D
- Securing co-funding for R&D
- Helping build capability of Australian scientists and industry participants
- Assisting in attracting youth (who have a global perspective) both into the industry and into agricultural R&D
- 'Trading' in international R&D with the potential to assist in delivery of government international aid objectives

MLA strongly believes that it must be integrated into the global innovation system and that it must ensure that it retains a 'seat at the table' for the long-term. For this reason, MLA has progressively implemented a proactive approach to the development of international collaborations over the past decade and we regularly engage in a variety of different types of international collaborations including:

- International networks to share knowledge and approaches in areas of common interest eg Five Nations collaboration on trade liberalisation research; collaboration on red meat nutrition and health research via the International Meat Secretariat; Tri Nations lamb research on nutrition.
- Participation in international studies of interest to the Australian industry eg animal welfare forum.
- Collaboration on food safety and microbiology research eg MLA has been invited to become a member of a US-based university advisory panel on *e coli*; collaborative research with the Danish Meat Research Institute on shelf life research.
- Facilitation of collaboration between Australian and New Zealand processing sectors on automation research.
- Longer-term investment in collaborative strategic research programs with international 'sister' organisations eg Meat Quality Science & Technology Research Program with Meat & Wool NZ which was a six-year program of research to develop processing interventions to improve eating quality.

Opportunities for collaboration are identified based on alignment with strategic industry and government priorities and an assessment of the overall benefit to Australia. Potential partners are identified via a range of mechanisms including: technology scanning; international study tours; participation in international food and agriculture conferences and trade shows; fostering strategic alliances with international research organisations; and placement of Australian graduates and researchers with international partners.

## **5.8 Whole of chain approach to R&D and building industry capability**

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The Productivity Commission has raised the issue of whether current levy and governance arrangements for RDCs has led to an excessive focus on R&D within the 'farm-gate', thus foregoing broader benefits and outcomes that may be derived from investments further down the value chain.

MLA strongly supports a whole-of-supply chain focus which ensures R&D is consumer-driven and which leads to a better delivery of outcomes. This approach also reflects an increasing recognition that for innovation to be successful in driving improved

productivity and success in achieving public good outcomes, organisational skills and capabilities across the whole supply chain need to be developed (Dodgson et al 2010). To support the development of a robust innovation culture and capability within the red meat industry, MLA has established a range of capability building initiatives including the Collaborative Innovation Strategies Program (see Box 5.3).

### **Box 5.3: Collaborative Innovation Strategies Program**

The Collaborative Innovation Strategies program (CISp) involves the co-development of comprehensive innovation strategies with individual enterprises from along the red meat supply chain. The aim of the program is to facilitate the development of broad innovation capabilities throughout the whole supply chain leading to: increased private investment in R&D; accelerated adoption of R&D outcomes; a more strategic focus in innovation initiatives; and greater impact derived from investment in innovation by companies. The initial target for this program has been the red meat processing sector because of its important role in the Australian red meat industry and ability to influence change throughout the entire supply chain. A key part of the program involves the appointment of an Innovation Manager within each participating enterprise to help drive the innovation capability building process. A formal Innovation Manager's network has been established to assist these Innovation Managers to acquire the skills required to execute their new role and to improve the collaboration between industry participants. This network meets at least twice a year to conduct professional development activities and to facilitate collaborative efforts between industry participants, research providers and MLA in a non-competitive environment. In addition, members of the Network are assisted to form linkages more broadly across other innovation networks and with innovative organisations from other industries. In addition, MLA facilitates an annual international innovation study tour to encourage participants from the red meat industry to form international partnerships in areas of mutual research interest.

MLA has demonstrated that a whole of supply chain approach can be accommodated within the RDC model and that it has not been constrained by an excessive focus on R&D effort within the 'farm gate'. This broader focus within the red meat industry's innovation strategy has been facilitated by the following elements:

- An MoU which involves all major sectors of industry committing to support key joint industry programs
- *Meat Industry Strategic Plan* which involves consultation and input from all industry sectors
- Levy contributions from the processing sector
- Additional voluntary contributions from participants from all industry sectors (via MLA Donor Company) to key projects with broad industry benefit
- A range of programs that meet needs of multiple sectors and deliver benefits along the supply chain (eg industry systems programs in areas of eating quality; food safety; product integrity; and traceability)
- Development and implementation of specific research programs which align with government priorities that clearly state the need for whole of supply chain focus (eg MLA's off-farm productivity and environment research programs; new products and value-adding)

- Communication of benefits to producers of investment further down the supply chain (presentations to producer Peak Councils; MLA annual general meeting)
- Broad supply chain representation on the MLA board
- Key account/stakeholder management within MLA for all major industry groups (producers; lotfeeders; processors; live exporters; value-adders; retail and food service operators)
- Close consultation with processor organisations (AMPC) in development of strategic off-farm R&D programs, with delivery coordinated via a single entity in MLA
- Specific programs aimed at building innovation capability along the supply chain eg Collaborative Innovation Strategies Program

MLA considers that the current RDC model as it applies in the red meat industry has facilitated the evolution of rural RD&E to incorporate the whole of the supply chain. The value of this more integrated approach (which is included in government's rural R&D priorities) should be strongly encouraged and supported.

## 5.9 Summary

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In this final section of the submission, MLA has addressed the questions raised by the Productivity Commission regarding the RDC model. MLA considers that the model is fundamentally sound and it has clearly demonstrated its capacity to deliver benefits to industry and the broader community.

It is argued that the role of RDCs is most appropriately considered within an innovation systems perspective, in which they perform a critical 'systems integrator' function.

Systems approaches to innovation propose that individual enterprises and supply chains cannot undertake effective innovation activities in isolation and that RDCs are uniquely positioned to facilitate, coordinate and optimise the complex interactions required at the level of their specific rural industry sectors.

As recipients of Australian government funding, RDCs can be viewed as key policy instruments within the national innovation agenda. As industry-funded bodies, RDCs also serve as a key mechanism for industry engagement leading to more relevant and strategic R&D investments that deliver both industry benefits and support the achievement of government policy objectives.

The integration and coordination role of RDCs complements and optimises the contribution of other elements within the system such as R&D providers; Cooperative Research Centres; technology commercialisers; and public and private extension agencies that all play a critical role in the development and delivery of new knowledge and innovation opportunities.

As demonstrated within the red meat industry, the model has proven to be flexible and to allow for adaptation as the needs of government and industry stakeholders have evolved. This has manifested in a number of ways including: the integration of marketing and R&D functions within MLA which has proven to be extremely successful in facilitating and reinforcing customer-driven innovation and has been the source of many of the most significant breakthroughs in the red meat industry; and the emergence of the three independent RDCs (MLA; AMPC; and LiveCorp) which provide a strong platform for whole of industry involvement while retaining a coordinated and administratively efficient delivery framework via MLA.

Finally, MLA believes that fundamental changes to the model are not warranted and that any deficiencies can be addressed through minor modifications that do not undermine the core strengths of the RDCs. This is not to say however, that further opportunities to evolve and enhance the RDC model do not exist and should not be explored in the future. The submission discusses a number of opportunities to improve and enhance the model particularly in relation to: working with government to more clearly articulate quantifiable deliverables from public investments; encouraging and supporting increased levels of international collaboration; and continuing to build on the effectiveness of the coordination role undertaken by CRRDC.

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